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THE WORLD'S PREMIER CAR MAGAZINE

47380



October 1991

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VOLUME 6, NUMBER 9 OCTOBER 1991

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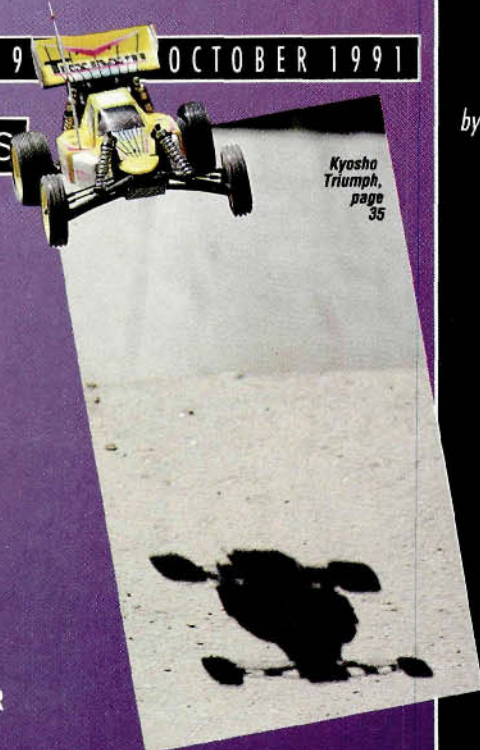
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HOT TRACKS

Doug's Hobby Shop Raceway, Waldorf, MD

ON THE COVER: the Kyosho Triumph dominates our cover. (Photo by Steve Pond.) Upper right: Joseph Gaczol's home-built pocket-size Lamborghini. Lower right: Richard Muise concludes his painting and detailing series. (Photos by Yamil Sued.)



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EDITORIAL

by STEVE POND



VARIETY IS the spice of life. Eating peanut-butter-and-jelly sandwiches all the time or taking the same bike route every day becomes boring, and buying a new car once in a while certainly makes driving to and from work less routine. A little change of pace goes a long way toward keeping your interest in something alive. The R/C hobby is one of the many activities that you can keep "spicy" with a little variety.

My R/C experience started with $1/12$ -scale on-road cars, and then I tried $1/10$ -scale off-road, $1/8$ -scale on-road, $1/10$ -scale on-road and $1/8$ -scale off-road. It wasn't that I was bored with any particular type of vehicle, it's just that I liked that breath of fresh air that comes with a change of scenery. Each new car presented new challenges, e.g., gearing, tuning, etc., to achieve the best performance.

As the editor of *R/C Car Action*, I've had the opportunity to run most types of R/C car. I've enjoyed all of them, and the occasional change has kept my interest in R/C at a perpetual high. Because of this, you might think I've done it all, but I was recently introduced to another dimension of R/C—model airplanes.

Tom Atwood, editor of our sister publication, *Model Airplane News*, was kind enough to supply me with a Kyosho Cessna Cardinal electric plane. It comes with a 540 motor, it runs on a 6-cell battery pack, and it requires a 2-channel radio—sound familiar? Although I had to buy an aircraft-frequency radio, all the electronic accessories that I've collected over the years work perfectly with the Cessna.

I'm not as good a pilot as I am driver, but many R/C car skills work well for R/C flying, and Tom seemed impressed by how quickly I learned to fly. This experience again presented me with new challenges. R/C cars will always be my first love, but this airplane, though it's only a docile electric trainer, has broadened my R/C horizons immensely. Can you rise (pun intended!) to a new challenge? ■

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LETTERS

WRITE TO US! We welcome your comments and suggestions. Letters should be addressed to "Letters," Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and brevity, and each must include a full name and address or telephone number so that the identity of the sender can be verified. We regret that, owing to the tremendous numbers of letters we receive, we can't respond to every one.

DAYS OF PARMA?

Great mag! I have three questions. When is the track report coming out for the Parma Days Of Thunder cars? I recently bought one and plan to run it on roadcourses and flat oval tracks in competition. People say it can't be done, and I want to prove them wrong! I equipped my car with a Team Tekin 310 Pro ESC, a Trinity Monster Stock motor, a Futaba

Magnum Jr. radio, Parma body mounts (the Velcro® looks good, but that's *all* it does) and a Bud's Super Bi-Level wing. For the sheet plastic (ha, ha), I use a Bud's Nissan GTP on roadcourses and a Parma Chevrolet Lumina on ovals. When I run the car on oval tracks, I use my modified LTO chassis with the battery on the left and the left front steering turnbuckle set on top of the spring instead of under it. I've set the car up for smooth carpet tracks, but I haven't been able to test it on any yet. This brings me to my second question: would I have a shot at beating a TRC Pro10 or a Bolink Eliminator 10 driven by someone whose skills are equal to mine?

You covered the Florida Winter

Champs in the July '91 issue. Can you send me Concours winner Michele Hartman's address? I'd like to see a bigger picture of her JR-X2 so that I can get ideas for my Coors Silver Bullet Nissan GTP body. Better yet, print this letter so that Michele, or anyone who runs a Days Of Thunder car can write or call me to swap ideas.

CRAIG (THE SILVER BULLET)
POTTS

4430 Summit St.
Willoughby, OH 44094

Well, Craig, you're in luck! The track report on the Parma Days of Thunder Mello Yello car is in this issue! Check it out and rejoice.

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As for your second question, you've really put me in a spot, but here goes: the Parma Days of Thunder cars aren't racing cars—sad, but true. I don't think that Parma designed them to win at the race-track. The Days of Thunder cars are, in a nutshell, working representations of the cars that you saw in the movie. They're designed for enjoyment, not serious competition. If you plan to race against cars like the Bolink or the TRC with your Days of Thunder car, be prepared for disappointment. I'm sure your car can be modified to perform fairly well, but this would probably entail a lot of custom work, because it has no rear suspension.

Policy dictates that we can't give out anyone's address without their consent,

so Michele, drop Craig a line so that you two can get together and talk paint. FM

I NEED SPEED!

For Christmas last year, I got an Associated RC-10CE. My friend and I bought a Tamiya Astute. I was disappointed when I saw his car go faster than mine. What would be the best accessory besides an ESC, motor, or practice? Will you ever do another car or tranny shootout? The Tekin ESC 250 that I bought secondhand broke. What should I do? Also, I've heard about people cutting off one speed controller wire—why?

ADAM KOIDE
McMurray, PA

Okay, Adam, let me get this straight: you're peeved because you feel that you have the better (i.e., more expensive) car, but your friend's car is faster. Believe it or not, you've answered your own question! The key to your problem could be one of two things: either your friend is using a faster motor than you are, or, if you're both using the same motor, he might be keeping his in better shape. Maintaining a motor entails replacing worn brushes, cleaning it properly with a good motor spray, and possibly sending it out to be rebuilt professionally. The second possibility is that your friend is a better driver than you are, in which case the other solution would be practice. Re-

(Continued on page 10)

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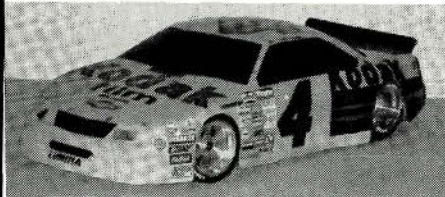
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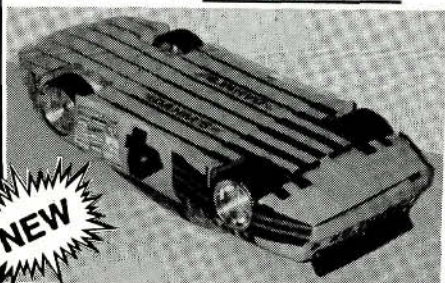
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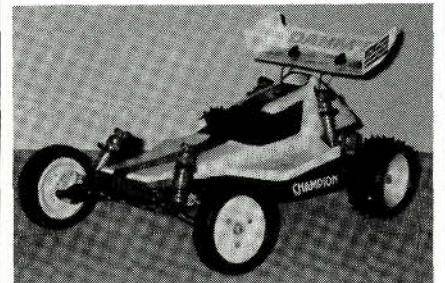
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LETTERS

member, all the accessories in the world won't make you a better driver!

Staging shootouts is a messy business: there can be many casualties. We've decided to brave the storm again, however, and we're working on two shootouts: the Team Car versus the JRX-Pro and a tranny shootout for the RC10.

Regarding your speed controller, the best course of action is to send it back to Tekin for repairs. The advantage of a three-wire speed controller setup is that it slightly reduces the controller's overall resistance. By jumping both the motor positive and the battery positive off one positive lead, you diminish the distance that the voltage has to travel. JH

MIX MASTER JR

I recently bought a JR Alpina PCM 2-channel radio, and I'm looking for a micro receiver. Does Novak or Tekin offer them for my radio system? Does either company offer a microservo that will work with my radio? Is the JR Alpina really a PCM like the 3-channel Futaba PCM?

JEFF MODENE
Redondo Beach, CA

Thanks for writing, Jeff. Here are the answers to your questions:

At this time, no companies make micro receivers for the JR Alpina PCM system. The new Novak NER-3FM receiver works with Futaba's PCM and Airtronics' Caliber 3P, but these radios use FM transmissions, and the Alpina transmits on AM.

As for the microservo, you're in luck. Any brand of servo will work with your radio. Just be sure to use the appropriate leads. The JR Alpina wiring harness is as follows: red is positive; brown or blue is negative; orange is the signal wire. If you're careful with these hookups, you shouldn't have problems.

The Alpina PCM is indeed a true PCM (pulse-code modulation) radio system (like the Futaba), but the Alpina operates on AM instead of FM. AS

WHICH JUNIOR IS WHICH?

I'm fascinated with the JRX-Pro and the Junior Two. I'm thinking about buying one of them, but I can't decide which one to buy. I love to read your magazine and to look at all the cars. I've done research from your magazine as well as from hobby shops, and I've already looked into motors, radios, batteries, chargers, and heavy-duty speed controllers.

I hope you can give me some information on these cars that will help me decide. Thank you for reading this letter.

BRIAN RYSIEWSKI
Shelby Twp., MI

I'm glad that you like the magazine, Brian, and I think that everyone should do a little research before becoming involved in R/C. Since you're a beginner, I recommend that you start with the Junior Two. It incorporates most of the JRX-Pro's performance features (i.e., Losi's LRM transmission, H-arm rear suspension, etc.) and you can easily upgrade it to a Pro later.

My advice to anyone who's thinking of entering the R/C world is to visit your local track and hobby shops, and find out what most people are using and how they like their equipment. This should give you enough information to make intelligent purchasing decisions. JH

SWIRVEL SAVER

Help! I'm having problems with my Kyosho Aerostreak. The radio system doesn't work right. I've checked all the wires and bought new batteries for both the car and the controller (Futaba 2PB/Sport). When I turn everything on and pull the throttle, nothing happens (my steering doesn't work either), but I can move the swirvel by hand, and it goes. Can you please tell me what's wrong with my car?

DAVID EPP
Lincoln, NB

The first thing you should do, David, is replace the "swirvel" with a servo. Your car's steering will be much better. Juuussst

kidding! Since you can move the servo by hand with the radio on, it's a good bet that the juice isn't reaching your radio. There are several possible reasons for this. Often, loose connections or broken wires are the culprits; since you've checked all the wires already, the crystal in the receiver may be damaged. If that's the case, you'll have to buy a new set of crystals. The only other thing I can think of is that your receiver has been damaged somehow. If the crystals and the connections are OK but the radio still doesn't work, send it back to Futaba for servicing.

FM

THIRD DEGREE!

I was just wondering what the term "degrees of timing" (referring to electric motors) means. I understand that a 9-turn motor is faster than a 17-turn motor, but I don't understand what "turn" means. Please help!

ROB GUNWALL
Hot Springs, S.D.

Just when I think I understand something, someone asks me to write it down! After minutes of intense concentration, Rob, here it is: on an electric motor, timing refers to the relationship between the brushes (which are located in the endbell) and the magnets (located in the can). When a motor is set to zero degrees timing, the armature's poles are at dead center of the magnets when the brushes contact the centers of the commutator segments. This is where the motor will operate the most efficiently (and have the most torque). If you advance the timing, i.e., rotate the endbell a number of degrees in the direction that the motor rotates (the can's entire circumference is 360 degrees), you change the relationship between the brushes and the magnets. This increases rpm (while lowering torque) and decreases the motor's overall efficiency, because less of the armature pole is aligned with the magnet. This lessens the duration of brush and commutator section contact. Whew!

"Turn" refers to the number of times the copper wire is wrapped around each armature pole. The fewer the turns, the higher the rpm. On a single wind, the wire is wrapped around the armature pole once; on a double, each pole is wrapped twice, but the wire is of a smaller gauge (size). A single-wind motor produces most of its power at the lowest rpm, and a double produces most of its power at higher rpm.

FM

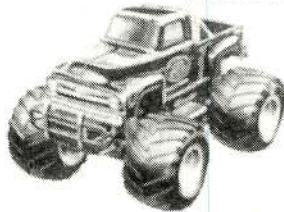
PUMPKIN PATCHING

I've had a Tamiya Midnight Pumpkin for about 1 1/2 years, and the battery that I use is about half as old. I've never had a problem until now. I was using an inexpensive PTI 1400mAh battery, and I noticed a significant loss of running time, speed and power. To fix this, I bought a Hobbico 1500mAh pack. The first time I ran it, the same problems occurred! What's the problem? Does the battery need to be broken in?

JORDAN STEED
Spokane, WA

Believe it or not, Jordan, I think that your problem lies somewhere other than in your battery pack. Although you don't go into much detail about the rest of your Pumpkin, I assume that you're still using the stock Mabuchi 540 motor. If so, it could be worn out, and this could cause reduced performance and run time. It may be time to buy a new motor. In addition to this, check out your speed controller. Are there burn spots? Is it shorting out? Look for signs of wear, e.g., discoloration and holes in the contacts. These things can also contribute to your troubles. If you follow the prescribed procedure, and you still have problems, make sure that your charger does an adequate job. JH

(Continued on page 153)



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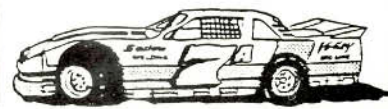
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Motor Sports

PUBLISHER'S PAGE

by LOUIS DeFRANCESCO, JR.



Publisher Louis DeFrancesco (standing) and Systems Manager Edward Schenk analyze data from the recent Car Action Survey. Air Age Publishing is on the leading edge of desk-top publishing technology, and it has one of the most advanced Macintosh networks in the entire publishing industry!

THE INCREASING demand by R/C consumers for more sophisticated products has brought about a dramatic transformation of the industry. I guess that, as the number-one R/C magazine, we're strategically positioned right in the center of this activity; people certainly assume that we're the "nerve center," and they constantly barrage us with questions.

The most frequently asked questions that come my way are, "So what's going on in the industry?" and "What do you hear?" I try to field these questions as well as possible by giving updates and telling about trends and the industry's general climate. I'm convinced, however, that the real question being posed is "Where is the industry headed?" A crystal ball, my R/C colleagues, I do *not* have! Sometimes, some good ol' conjecture is about all I can offer to the most anxiety-ridden R/C notable.

We just have to go out and ask consumers what the heck is going on; hence, our 1991 *Car Action* Reader Survey, which we featured in the September issue.

It has been almost two years since our last survey, and it's no secret that the industry and consumer demands have changed significantly. Our survey of R/C activities is one of the most comprehensive, and we designed our own software package to analyze the data. When all the statistics have been compiled, we make the results available to the R/C advertising community.

The bottom line is that your input is critical. We can respond to your needs faster and a lot more intelligently if we know what your needs are. So fill in those little squares, get movin' down to your local post office, and send the questionnaire back to us. And in keeping with our survey tradition, we'll draw a name from among all the respondents, and the winner will receive a brand-new Airtronics Caliber radio—not bad! Hey, what are you waiting for? It's *your* magazine! ■



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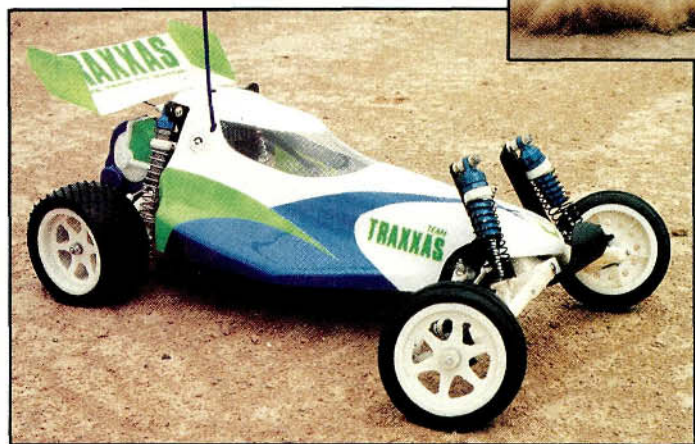
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INSIDE SCOOP

by CHRIS CHIANELLI

THREATENING PROTOTYPE



Here are pictures of Traxxas's secret Talon prototype that has been causing so much consternation on the 2WD racing circuit. Scheduled for release any minute, the Talon isn't just a Blue Eagle with car tires. According to my sources, all but a handful of parts have been designed or modified specifically for this car. Though its tranny still has a slipper clutch and the three-gear Pro Series setup, its compact gearbox has

been completely redesigned. Thirty degrees of front kick-up has been molded into the Talon's graphite chassis, and it has more ground clearance with plenty of suspension travel—2 inches up front and 2.5 inches in the rear! The proof is in the pudding, and here's a taste of it: the Vector TQ won Modified and Stock A-Mains and an Invitational at recent state championships in Georgia and Texas! The prototype also made its presence known in the 2WD Mod B-Main at the World Champs Warm-Ups in Michigan. Team Traxxas's Scott Montgomery finished half a lap ahead of Masami, who was ahead of Joel Johnson, who was ahead of Gil Losi! Could the pudding be too sweet?...never!

As directed by the Ayatollah of Radio Controlla, Commander Crash Chianelli reports back to the faithful followers of the Grand High Exalted with pertinent information! I'm back from my latest espionage excursion with microfilm, spy shots and stolen communiqués that read as follows:



MAXIMUM SECURITY



Trinity's improved Security Plugs have a locking system with a new keyway that Trinity claims can't be pulled apart once it's pushed down and locked in place. The plugs have also been plated with a new, non-corrosive, silver compound that reduces voltage drop and increases conductivity. Oh yes! As of late, Uncle Ernie has been heard to mumble, "The Oval Man cometh to kick serious butteth." Could this mean still more "trouble in triplicate" for the competition?

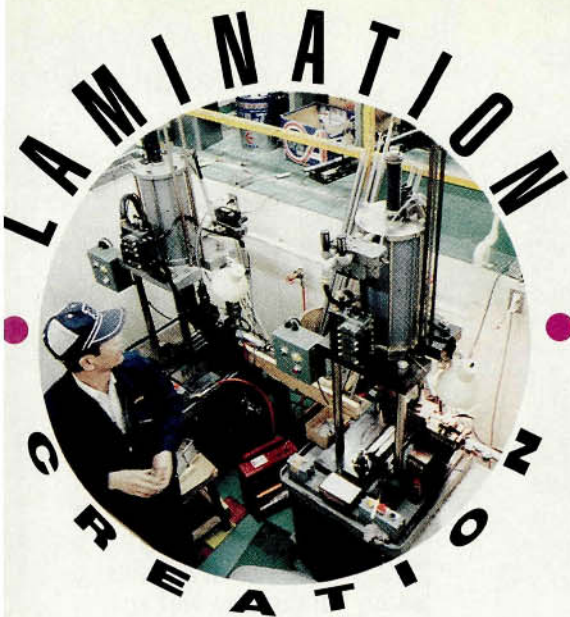


Tennessee Gasser

Hobby Lobby International of Brentwood, TN, announces the addition of a machine with three differentials—the Avenger—to its 1/8-scale car line (which includes 2WD and 4WD versions of the Hunter and the Tornado). The Avenger features: wide-track, super-low-profile tires with two-piece rims; Teflon clutch shoes; front and rear sway bars; an aluminum chassis; a new tuned muffler; heavy-duty hardware; and a full set of ball bearings. Like Hobby Lobby's other cars, the Avenger comes assembled, and it's priced very reasonably.



LENGTH: 460 mm
HEIGHT: 180 mm
WIDTH: 302 mm
WHEELBASE: 150 mm
NET WEIGHT: 3,800 g
TOTAL WEIGHT: 3,550 g
ENGINE: 21 CLASS
RADIO: 7 CH



This is a very rare photo. Ostensibly, it was taken inside the Sagami Micro Co., Ltd. factory, or so I'm told by a secret source. The piece of machinery is the highly guarded lamination machine. Ever wonder where all those little metal slices that make up your motor's core come from? They probably come from this very machine.

STEEL WHEELS

Has this ever happened to you? At a critical point during a race, a hammer "T-bones" your car, causing it to lose its wing, and forcing its handling to go south? Well, no need to throw the hammer's car against the drivers' stand in a rage of infantile revenge; that's not appropriate behavior for the '90s. Next time, be prepared: show up with this model of a 1943 Russian T-34 tank, and blow the moron away with its 15mm cannon. Well, it

doesn't really have a cannon, but this 5 1/2-foot-long monster *does* weigh 250 pounds, so squashing a 1/10-scale nuisance shouldn't be a problem. The full-size T-34 is considered by many to have been the best tank of WW II. The 30-inch-wide, 1/4-scale model is 26 inches high.

It's made of aluminum plate and castings, and it has fiberglass-reinforced plastic details. Powered by a 2-stroke engine, the tank has 87 cast pieces in each of its 5 1/4-inch-wide treads, and it's reported to be in production!! For more info, contact Sonny's Sport Shop, 53 Cote Dr., Epping, NH 03042.

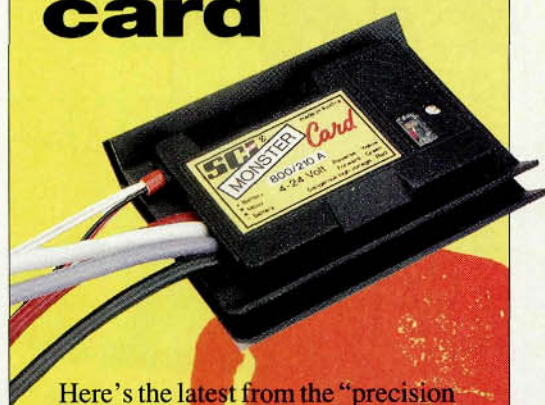


BLADE RUNNER

Nikko does it again in the novelty department! According to what's written on the box (and I'm not in the mood to argue) this electric-powered hydrofoil model is 1/30 scale and goes by the name "Shock Wave." As far as I can tell, it's the only ready-to-run hydrofoil available today. Powered by a small Mabuchi 380 motor, the Shock Wave is reported to run well and get up on its blades easily. I'll find out for myself, and then I'll hop it up and make my own Wave-Bladed Shock-Runner...no, wait...Shock-Bladed Runner-Wave...Running-Blade?...Forget it. I'll try to make this thing very fast.



monster card



Here's the latest from the "precision hills" of Austria: the SCI Monster Card with reverse. Rated for up to 24 volts, this heavy-duty electronic speed controller was specially designed for monster trucks, and it has 16 FETs, two hefty heat-sink plates and LEDs for forward (green), reverse (yellow) and voltage overload (red). By the way, guess which controller Sonny's Sport Shop used for the electric T-34 tank prototype? You got it—the Monster Card. Don't leave the crypt without it!



Full-scale SPONSOR



This is Bruce Holocek, CEO of Hobbico, with his wife Jeri (Chief Operating Officer), their son Justin and the Powell Motor Sports ZR-1 Corvette of which Hobbico is an associate sponsor. The ZR-1 competes against RX-7s, Nissan 300-SXs, Lotus Esprits and other ZR-1s in the Escort World Challenge Race Series. Hobbico's sponsorship is part of an ongoing project to promote the R/C hobby to the public.



INDOOR DIRIGIBLE

Here's the Japanese *Radio Control Techniques* magazine's 30th anniversary helium blimp. A 3-channel radio controls the three electric motors that drive its props. The port and starboard props control forward and reverse and, with one in forward and the other in reverse, they turn the mini-airship. The third, "belly-mounted" prop controls altitude. No word about availability in the U.S.

Raborn

RACING ORIGINALS



Oval Products	
\$59.95	1000 RC-10 Lefthand Oval Chassis
69.95	1001 RC-10 7 & 4 Oval Slotted Chassis
59.95	1020 JRx2 Lefthand Oval Chassis, 30", 1/2 Longer
69.95	1021 JRx2 7 & 3 Oval Slotted Chassis, 30", 1/2 Longer
59.95	1040 Ultima Lefthand Oval Chassis, 30", 1/2 Longer
69.95	1041 Ultima 7 & 3 Oval Slotted Chassis, 30", 1/2 Longer

RC-10 Telescoping Drive Systems	
64.95	2001 Drive System for MIP & J Car w/H-Arm
64.95	2002 Drive System for Trackmaster w/H-Arm
64.95	2003 Drive System for Stealth, Stock, AGL & TPS w/H-Arm
64.95	2004 RC-10 Truck Drive System for Stealth, Stock, AGL & TPS w/Wide Truck Arms & Hub Carriers

Batteries	
59.95	100r 280+ 1400 Pro SCR

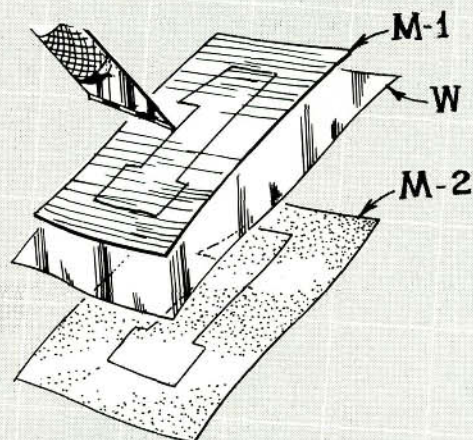
Raborn Racing Originals
6707 Chimney Rock
Bellaire, TX 77401
713-668-8866

For a Catalog Send \$2.00

Dealers Contact Hobby Dynamics Distributors, Eagle Distributing
Great Planes Model Distributors

PIT TIPS

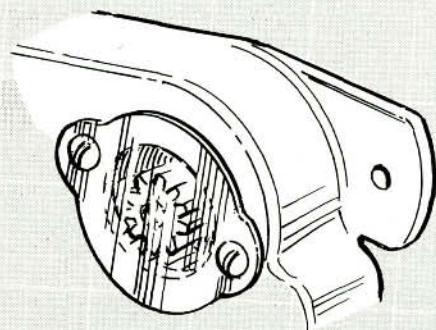
by JIM NEWMAN



INSIDE MASKING NUMBERS

"W" is waxed paper; "M-1" is masking tape with the sticky side facing downward; and "M-2" is masking tape with its sticky side up. Cut right through all three, then use only the number cut out of M-2 to mask the inside of the body shell, since its adhesive is on the right side.

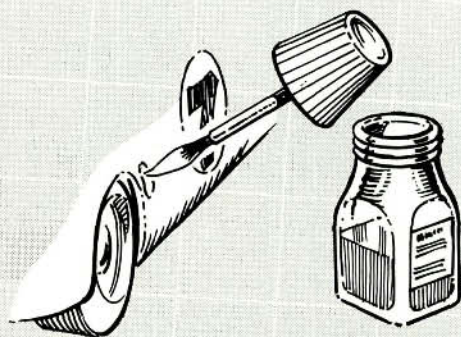
Gerry Lamothe, Easthampton, MA



BLACKFOOT PINION COVER

Make this professional-looking pinion cover with a piece of plastic, 2-liter soft-drink bottle. Use the existing screws to hold it in place.

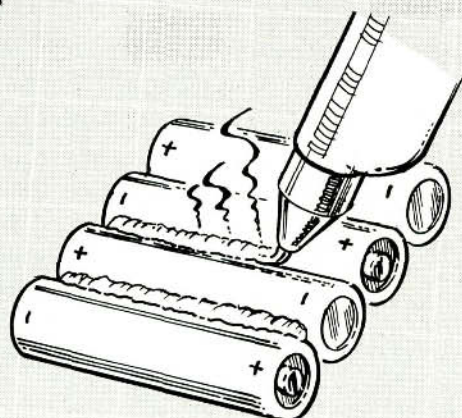
Dennis Romero, Stockton, CA



TOUCH-UP KIT

Use thinners or nail-polish remover to clean an empty nail-polish bottle or a plastic-model enamel-paint bottle. Fill the clean bottle with the paint you used on your car, and take it to the track so that you can touch-up unsightly chips between races.

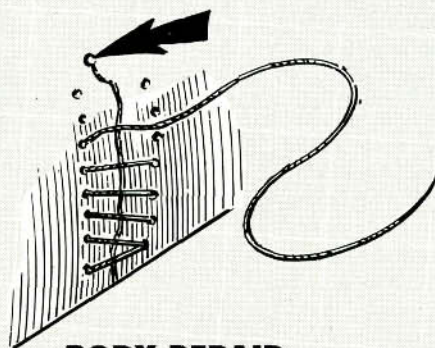
Doug Surette, Sebago Lake, ME



GLUED NI-CDS

Before attempting to solder the braids across the cells, lay the cells side by side, as shown, making sure the positives and negatives are arranged as drawn. Now use your hot-glue gun to run glue between the cells and conveniently hold them together for soldering.

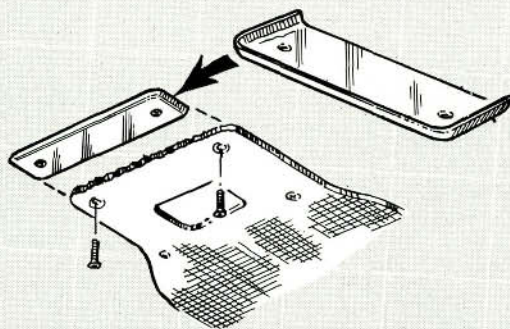
Mike Larson, Ottawa, IL



BODY REPAIR

To prevent a crack from lengthening, first drill a $1/16$ -inch-diameter hole right at the end of it (it's called "stop-drilling"). Next, drill pairs of small holes along each side of the crack. Sew the crack's edges together with nylon cord. If you harden the end of the cord with CA, you'll be able to slice a point on it and use it like a sewing needle. Put a little CA on the cord to solidify your repair.

Cody Bradford, Wetaskiwin, Alberta, Canada

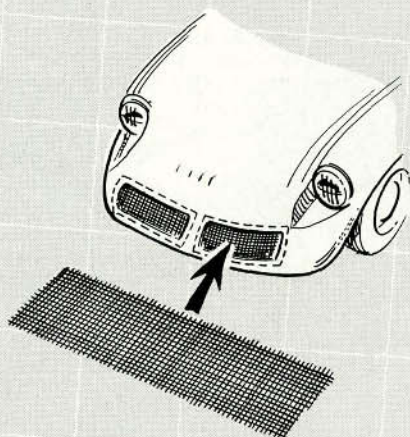


GRAPHITE CHASSIS PROTECTOR

If the front edge of your car's graphite chassis is being chipped away by stones, shield it with a strip of cookie tin. Carefully bend up the tin's edges on three sides so that they can be wrapped over the edge of the chassis. Use the existing screws to hold the shield in place.

Jon Shill, Ann Arbor, MI

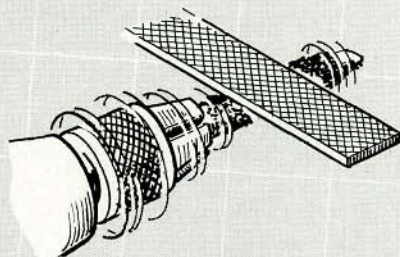
PIT TIPS



VENT GRILLS

Make vent grills out of small pieces of 1-inch-wide gauze that has been dyed black with shoe dye, spray enamel, black ink, etc. When the gauze is dry, it's stiff enough to be trimmed and glued inside the body shell.

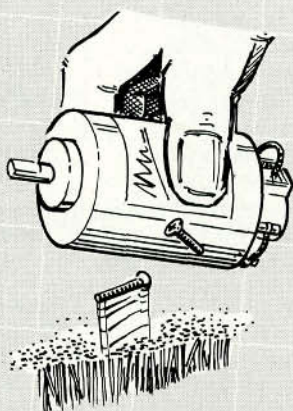
Emory Findley, Crofton, MD



SOLDERING-IRON CLEAN-UP

Carefully remove the soldering-iron bit, and put it gently into a drill chuck (don't overtighten the chuck). While the chuck is spinning, gently rub the iron's bit with a file to remove the horrible black corrosion, then finish cleaning it with a piece of fine emery paper. Wear safety goggles while you do this!

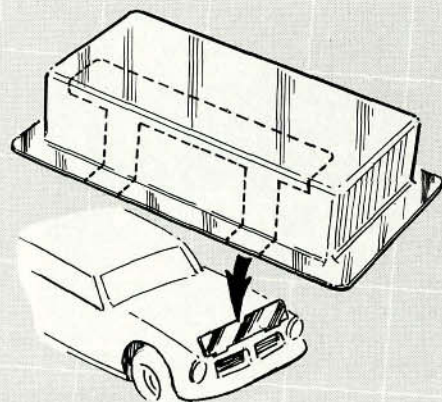
Mike Wittig Jr., West Chester, PA



SMALL-PARTS RETRIEVER

If you drop steel screws, nuts or clips onto the rug, use your motor. Its powerful field magnet will pull them right out of the carpet pile.

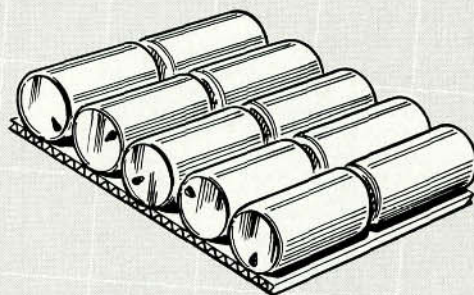
Jimmy Thai, Philadelphia, PA



BLACKFOOT BUG SHIELD

Make a transparent-plastic bug shield by carefully cutting the appropriate shape out of a blister pack. Cut the shield so that it has two long tabs at 90 degrees to it. The tabs will fit nicely under the edge of the grill, where they can be held with small screws.

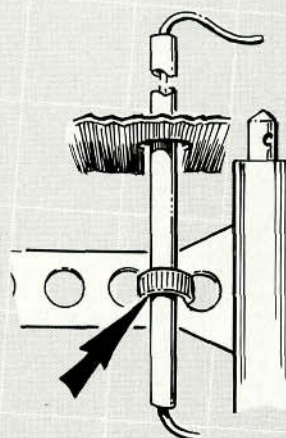
Lee Southam, Salt Lake City, UT



POP-CAN CRUNCHIES

If you don't have a stock of old car bodies to crush, try this. Save your soda cans; glue them onto cardboard; and make a suitable ramp out of scrap plywood, etc. Four rows of 20 cans make a great "crusher course."

Clay Berry, Kettering, OH



BLACKFOOT BODY REMOVAL

Drill a hole in the body shell for the antenna tube to poke through, then use a nylon tie-wrap to clamp the tube to a body-mount bracket. Now you'll be able to slip the body shell up over the antenna when you want to remove it.

Cory Cole, Wharton, OH

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.

READERS' RIDES

"Readers' Rides" is our way of recognizing the unique, innovative—and sometimes bizarre!—vehicles that our readers have created. Send us a sharp, uncluttered, well-exposed color photo of your car or truck (no Polaroids, please!), along with a brief description, to Readers' Rides, R/C Car Action, 251 Danbury Rd., Wilton, CT 06897. If the Ayatollah chooses your photo, you'll receive a one-year subscription to Car Action, or an extension to your existing subscription. You'll also be eligible for the third annual "Reader's Ride of the Year Contest" in the fall of 1991. Write your address and phone number on your letter and on the back of each photo you send, in case we need to contact you.



■ RACE READY

Mark Ingle of Estacada, OR, is the owner/driver of this hot RC10 Team Car. Mark added a Novak 410 M1c ESC, an Airtronics CS2P radio, Lunsford titanium shock shafts, tie rods and hinge pins. For motivation, Mark uses a Reedy Modifieds Mr. R. 16 triple and a set of Team Losi tires.



■ BEL-AIR BEAUTY

Roger D. Evans of Weirton, WV, wanted a hot rod that looked and sounded like the real thing. The chassis is a Kyosho Corvette ZR-1 (minus the Corvette body), and it's powered by an O.S. 12-CZR. Atop the frame is a Parma 1957 Chevy Bel-Air coupe body. A "trick" airbrush flame job by Roger's son Darin completes this classic.



■ BOUNCING BABY BED

In the style of the Primadonna Clod (August '91 R/C Car Action) comes this crazy-looking Clod Buster. Jimmy "Jimbo" Keola of Kaneohe, HI, started with a stock Clod and worked his way up to this beast! This Clod's most distinctive feature is its "dancing" bed, which moves in six directions and spins clockwise and counterclockwise. Finishing off the look is a wild, 11-coat, candy cherry-over-white paint job with six coats of clear protectant.

■ GO LEFT, YOUNG MAN

Terry Van Dunk of Middletown, NY, owns this outrageous-looking dirt modified. Under the custom-made body rests an RC10 with an MIP tranny, a Novak 1X ESC and Kyosho Gold shocks. To add that touch of realism, Terry painted his car to look exactly like a *real* dirt modified. This month's "Go Left" award goes to Terry for his mean machine!



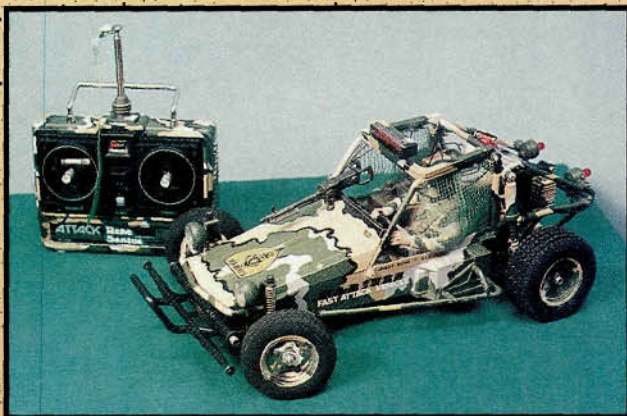
■ TROPICAL TRUCK

All the way from the island of Curaçao in the Caribbean comes this rad-looking street truck. Cedric Mercera is the mind behind this machine. Cedric started with an Associated 10L fiberglass and added a full complement of Novak radio gear (T-4 speed controller, 2X mini-receiver, and 1A miniservo), a Futaba radio and a Reedy Modifieds

motor. All this is powered by Trinity 6-cell pushed SCRs. With a set of TRC green-dot foam tires, this mini-truck is ready to hit the street!

■ VOLCANO VOYAGER

This camouflaged Tamiya Fast Attack is owned by Master Sergeant Rene Santos of the Philippines. Rene has basically kept his car in stock condition, except for the *killer* camouflage paint job; the working head and taillights and the flashing light bar. To increase the machine's pep, Rene also added a Le Mans 360 PT motor.



■ KING OF THE HILL

Dustin Knudson of Hawley, MN, had to do a project for school, so he built a Traxxas Sledgehammer and wrote a report about it—great idea! The truck is mostly stock, but he made some modifications to enhance its handling. He used a full Futaba radio system along with a Kyosho Super Stock 34-degree motor. Dustin gets the *R/C Car Action* gold star for this cool piece of homework.





Testarossa

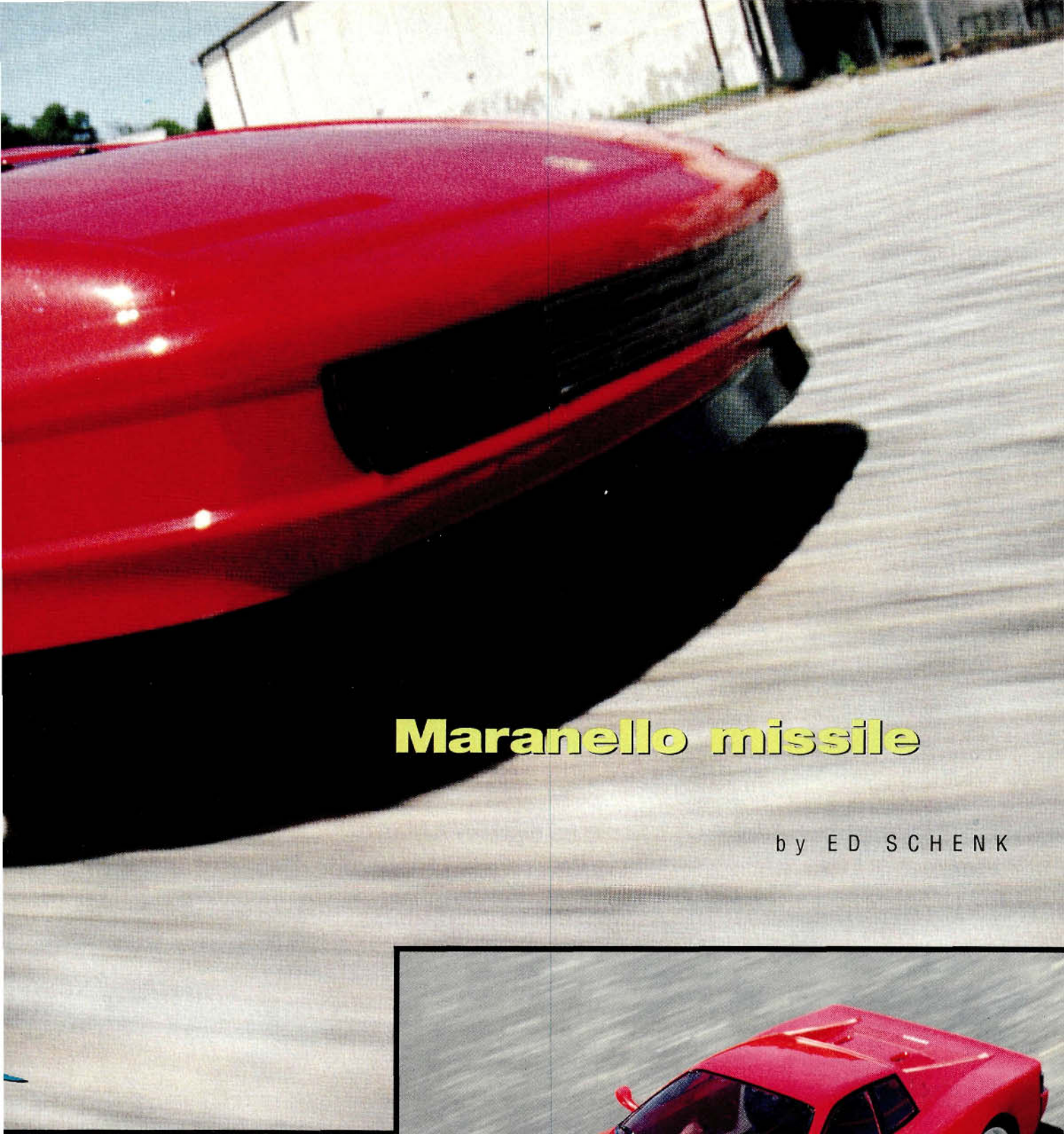
K Y O S H O

B EING AROUND full-scale Ferraris is a daily experience here at Air Age Publishing. Some days, our publisher arrives in his new 348ts coupe; other days, he's in his modified 500hp Testarossa. Being around them is pleasant,

being *in* them is even better, and listening to them is an experience in itself. Ferraris are similar to exotic racehorses—highly valuable, well cared for and often admired. Ferraris have a legendary mystique of their own. As you can

see, it's only natural that an impartial Ferrari admirer like myself review the new Kyosho* Testarossa.

The Ferrari Testarossa is part of the Kyosho Scale Car Series, a 1/10-scale collection of on-road cars that offers incredible scale



Maranello missile

by ED SCHENK

detail as well as easy assembly. Its companions include the Lamborghini Countach and the Ferrari F-40. The highly detailed Testarossa body is a real attention getter; there's no mistaking this car for anything but a Ferrari!



THE KIT

The Kyosho Testarossa is a mixture of new features and proven technology. It incorporates Kyosho's world-championship-winning Ultima II chassis as its foundation, which, by the use of short shocks and different mounting positions, has been lowered significantly to achieve a low-slung, scale appearance that matches the sleek Ferrari body perfectly. The suspension can be set up for most track types, including carpeted and paved oval. Features include 4W independent suspension with oil-filled shocks for smooth handling, and Kyosho's durable rotary speed controller.

The kit consists of the Kelron chassis from the Ultima II, bagged and numbered plastic parts connected to part trees, several screw bags, striking chrome rims with Bridgestone Potenza tires, and oil-filled shocks. As with most kits, dealing with parts trees is a tiresome necessity, so make sure you carefully remove all flashing (the excess material left over from the moulding process). Most builders use small scissors or nail clippers for this.

ASSEMBLY

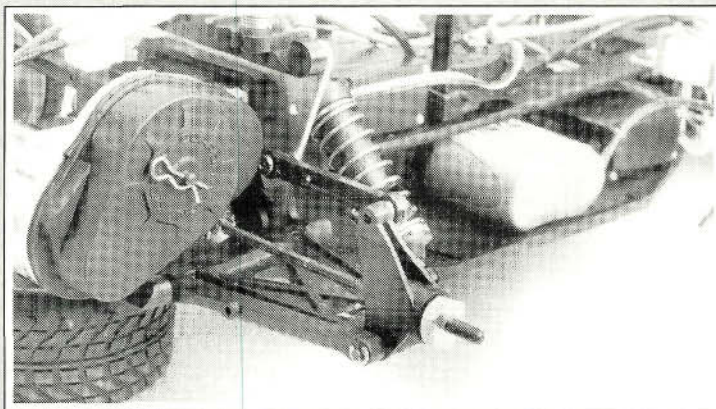
Assembly of the Testarossa began well. In no time at all, I breezed through the first few steps and started on the gearbox. Everything fit together nicely—something not always true of molded plastic parts. Where applicable, Kyosho alerts you to any upgrades that are available. There's an optional ball bearing set (part no. 1974) to replace the supplied bushings. The Kyosho Option House offers a ball differential (part no. W-0109) that replaces the standard gear diff found in its Scale Car Series. The ball diff can be adjusted to allow a little slippage under heavy acceleration—something a gear diff can't do—but for this article, I didn't use any modified parts because I wanted to test the car as close to stock as possible.

Another nice feature of the Testarossa's transmission is its gear access cover. Changing pinion gears is a breeze with this setup, and the supplied rubber stripping holds the cover snugly against the metal faceplate. Since I probably won't be running this car in dirt, a gear cover isn't really necessary, but it's better to be safe than sorry, so it stays on.

You may want to eventually try a different pinion gear from the one supplied with the Testarossa. Try a few sizes and see what performs best. When experi-

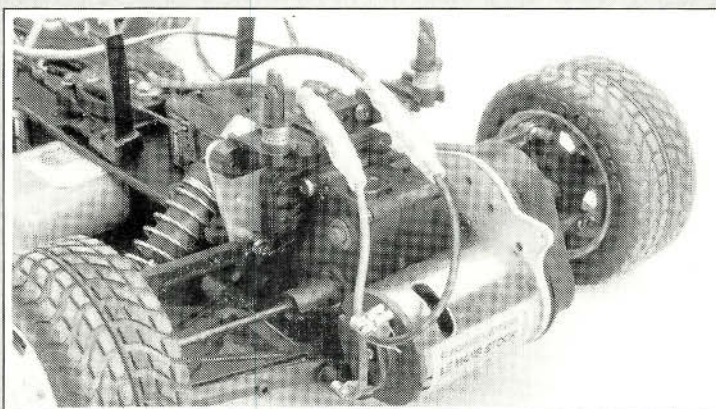
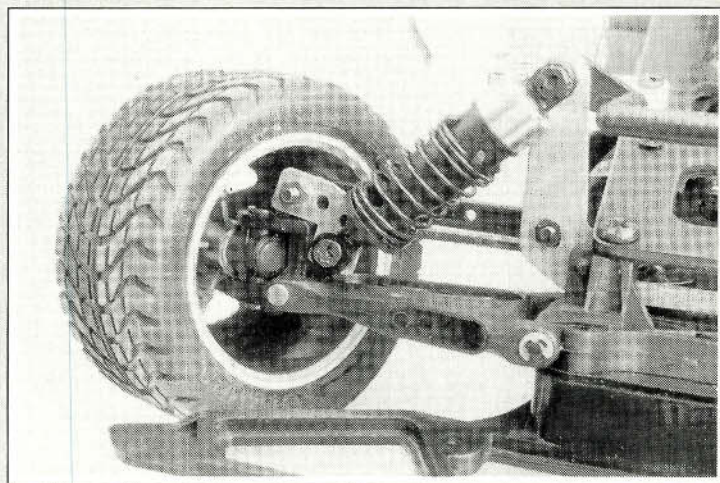


TESTAROSSA



By altering the mounting positions of the Kelron shocks, the chassis was significantly lowered to give the Testarossa a low-slung look.

Under the Ferrari body, you'll find a slightly modified Ultima II chassis. The shock-mounting positions have been altered to give the car a lower stance. The large bumper wards off curbs!



The Ferrari's transmission is the standard Ultima II unit. To increase realism, semi-pneumatic tires with treads that look like those of their full-size counterparts were used.

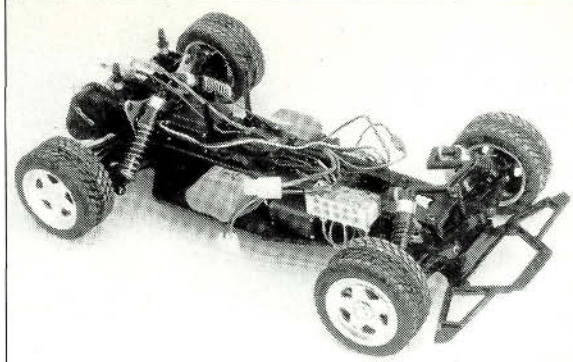
menting, start with the smallest pinions and work toward the bigger ones until a good compromise of speed and torque is found for the track on which you run. Kyosho offers six tooth sizes to meet a variety of race conditions. The sizes available are: 14T, 16T, 17T, 18T, 19T

and 20T (part nos. OT-51, OT-52, OT-53, UM-23, UM-24 and UM-25).

The motor is a stock Le Mans 05 Kyosho—the motor used in the Raider and other production-class Kyosho cars. As with all new stock motors, it's advisable to break it in before running to allow

the brushes, the commutator and the bushings to seat properly. To do this, run the motor (with nothing attached) at around 3 or 4 volts for five minutes, giving the commutator a good shot of motor spray every minute or so to clean it of any brush residue. An old 4-cell pack works well for this; some people prefer two alkaline D-cells. Whatever you use, running the motor at low rpm is essential for this step.

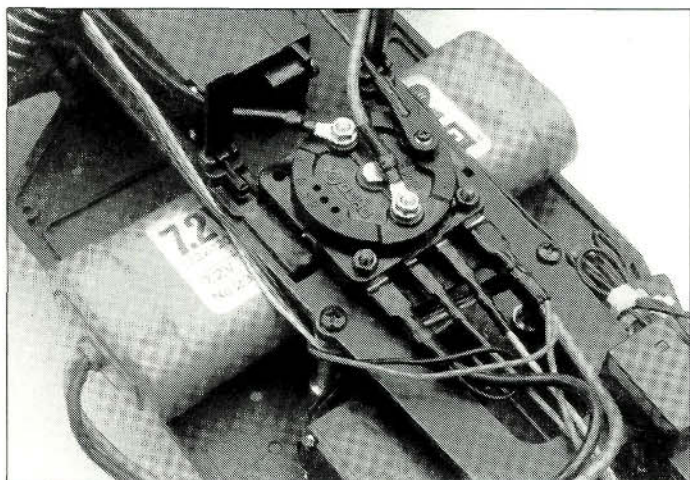
The rotary speed controller is surprisingly simple and functional. Its movement is smooth, and the control positions are printed right on its face for easy adjustment during assembly. With this design, it's very important to check your work and be sure that the servo rod doesn't brush the positive connection nut. This may short-out your motor, damage your speed controller, or even smoke your battery pack for good! (*Editor's note: sounds as if Ed is speaking from personal experience!*) Every once in a while, it's recommended that you disassemble and clean the unit with a commercially available motor cleaner. This will ensure a longer life and increase your controller's reliability.



that permits easy access to all mechanical and electronic components, making the Testarossa a breeze to maintain.

Adjusting the car is a simple task, providing you've carefully assembled your tie rods and adjusted them to the proper length. The toe angle will affect both straight running stability and steering response. I found that adjusting the tie rods to give just a little toe-in (front of the tires pointing inward) gave me the best results.

With the car on a flat surface, raise the front end of the chassis from the center and then lower the front wheels slowly to see whether they touch the ground evenly. (This trick can be used with many cars). If they don't, adjust the length of the shocks. If they aren't even, steering to the right and left won't be even. Repeat this procedure for the rear as well.



Mounted to the upper Kelron chassis plate is Kyosho's heavy-duty rotary speed controller, which is included in the kit. The Testarossa can use stick packs as well as saddle-pack batteries.

The Ferrari's shocks are the oil-filled, composite-bodied type used throughout the Ultima II Series. They were simple to set up and adjust. Shock oil also plays a role in your car's performance. If you don't want to use the provided oil, Kyosho offers a shock-oil set for the Scale Car Series. The set contains oils of three thicknesses in color-coded bottles (no. 1951, Shock-Oil Set). Kyosho Frontier Teflon Oil (no. 1883) is used to reduce friction on moving parts.

Once you've assembled the car, you'll see that it has a simple, uncluttered design

Assembling the body was a truly enjoyable experience. With a little imagination, you can picture yourself working on the assembly line in Milan while gleaming red Ferraris slowly roll by. To further enhance scale realism, the Testarossa's cheese-cutter side ducts are actually molded out of plastic and screwed to the body. I used flex tape for the paint job and was very pleased with the results. I had originally planned to run trim tape around the exterior of the windows, but I was so pleased with the results that I didn't think this was necessary. Unlike the earlier

(Continued on page 74)

K Y O S H O

FERRARI TESTAROSSA

Type On-road
Scale 1/10
Sug. Retail Price \$219.95

DIMENSIONS:

Overall Length 21 inches
Width 9.75 inches
Wheelbase 10.75 inches
Track (f/r) 8 inches

WEIGHT:

Gross (with battery) 3 pounds, 10 ounces

BODY:

Type Post-'87 Ferrari Testarossa
Material Polycarbonate

CHASSIS:

Type Upper and lower plate
Material Kelron

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear
Differential(s) Bevel gear
Bearings/Bushings Metal bushings

SUSPENSION:

Type (f/r) Independent A-arm
Damping (f/r) Oil-filled, coil-over shocks

WHEELS:

Type (f/r) One-piece plastic
Dimensions (DxW) (f/r) 1.9x1.25 inches

TIRES:

Front/Rear Bridgestone Potenza

ELECTRICS:

Motor Kyosho 05 Stock
Battery Trinity SCE*
Speed Controller 3-speed forward, 1 reverse rotary

OPTIONS AS TESTED:

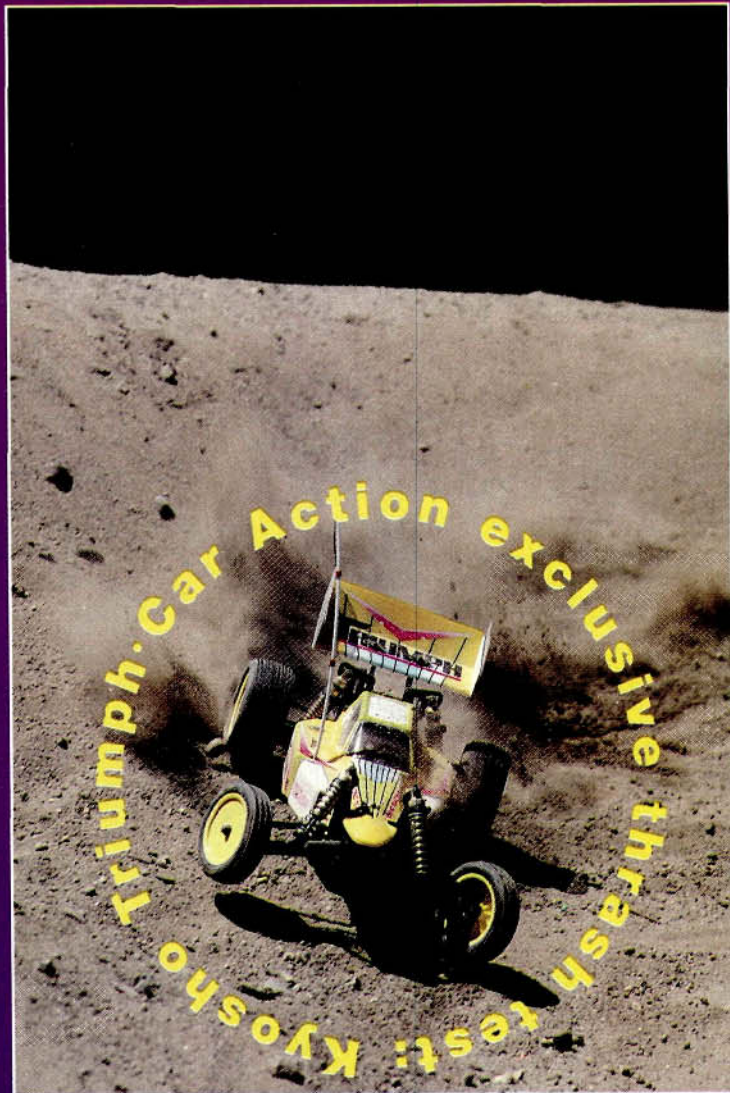
MRC Top Gun radio; Trinity 6-cell SCE pack.

COMMENTS:

This car is a real looker! The body's scale appearance is great. Its chassis is based on the ever-popular Ultima chassis, which has infinite set-up possibilities. If you're looking for a "fun" car to run in a parking lot, but you also want to take it off-road, this is the ticket!

* not included

KYOSHO





by STEVE POND

THE CHEVY CORVETTE and the Ford Mustang are prime examples of U.S. muscle-car classics that haven't changed much over the years. Sure, there have been minor aesthetic changes, but for years, the chassis used components that had been passed down from previous models. This is also the case with some of our R/C cars. Team Associated's RC10 and Kyosho's Ultima—the mainstays in 2WD off-road—have retained many of their original features.

Both in full-size cars and in R/C, there are two primary reasons for passing down components from previous models:

(Continued on page 39)

TRU



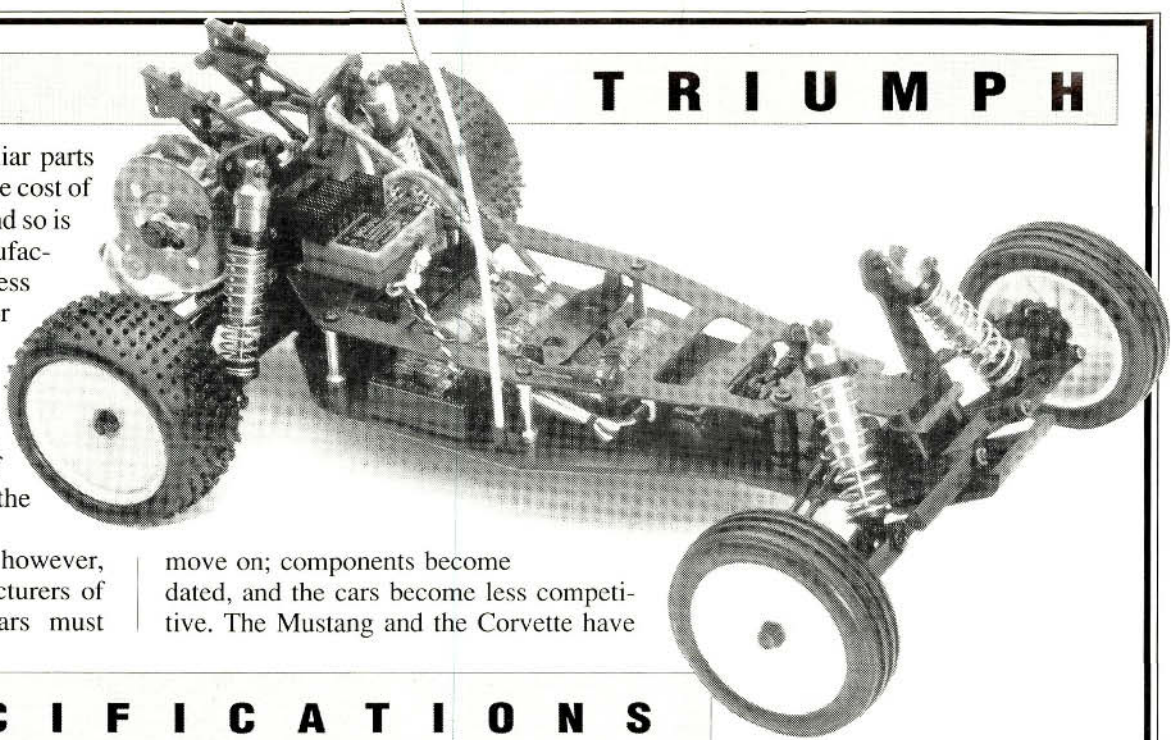
TRIUMPH

• By using many familiar parts in a new car's design, the cost of re-tooling is reduced, and so is the overall cost of manufacturing. The result is a less expensive product for the consumer.

• The number of replacement parts required will be limited because each version of the car uses many of the same parts.

There comes a time, however, when both the manufacturers of full-scale and R/C cars must

move on; components become dated, and the cars become less competitive. The Mustang and the Corvette have



SPECIFICATIONS

Type Off-road
Scale 1/10
Sug. Retail Price \$279

DIMENSIONS:

Overall Length 15.0 inches
Width 9.5 inches
Wheelbase 11.0 inches
Front Track 8.0 inches
Rear Track 7.75 inches

WEIGHT:

Gross (with battery) 3 pounds, 7 ounces

BODY:

Type Buggy
Material Polycarbonate

CHASSIS:

Type Pan with upper deck
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur
Transmission Belt
Differential Ball
Bearings/Bushings Ball bearings

SUSPENSION:

Type (f/r) Single A-arm with upper control link
Damping (f/r) ... Oil-filled, coil-over shocks

WHEELS:

Front: Type One-piece nylon
Dimensions (DxW) 2.14x.75 inches
Rear: Type One-piece nylon
Dimensions (DxW) 2.22x 1.375 inches

TIRES:

Front Ribbed
Rear H-pattern/mini-spike

ELECTRICS:

Motor 540/05*
Battery 6- or 7-cell stick pack*
Speed Controller Electronic*

OPTIONS AS TESTED:

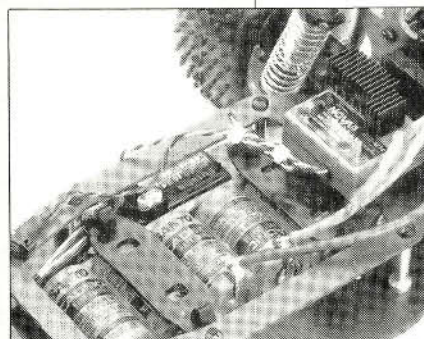
Novak 410-M1c speed controller; DA Graphite chassis; Reedy Mr. R motor; Futaba PCM radio and 9301 servo; Sanyo* SCRs; MK Pro Diff kit; Litespeed* Tuff-Stuff; Team Losi Pinion Gears; Motion Graphics custom-painted body.

COMMENTS:

The Triumph has all the elements of a world-class car. Its very stiff, strong chassis allows the suspension to absorb the bumps. The new transmission is also an improvement over previous Kyosho units. To improve traction on hard-packed tracks, the suspension springs in the front could be a little softer, but overall, the Triumph is a potent performer. The 2.2-inch wheels will have to be swapped for smaller wheels if the Triumph is to be run in ROAR-sanctioned events or on tracks abiding by ROAR rules.

* not included

Right: Novak's high-frequency 410-M1c speed controller transfers battery power to the motor.



both had major overhauls to keep their technology current and to maintain their edge in the performance market.

For more than five years, Kyosho has enjoyed success with its Ultima off-road cars, but it decided it was time to retire the 1987 World Champion. To remain competitive, the company wanted to build a new car that would incorporate some of the newest technological developments, and after two years of R&D, the result is the new Kyosho* Triumph.

The Triumph's design is completely new (the only connection with any previous Kyosho car are its rod ends). It has a completely new double-deck graphite chassis, a belt-drive ball-differential transmission and new, unique suspension geometry.

The front and rear suspension has exceptionally long A-arms that are designed to limit tire scrub.

With a narrower chassis and longer A-arms (and given the same amount of suspension travel), lateral wheel movement is reduced in comparison with cars that have shorter suspension arms.

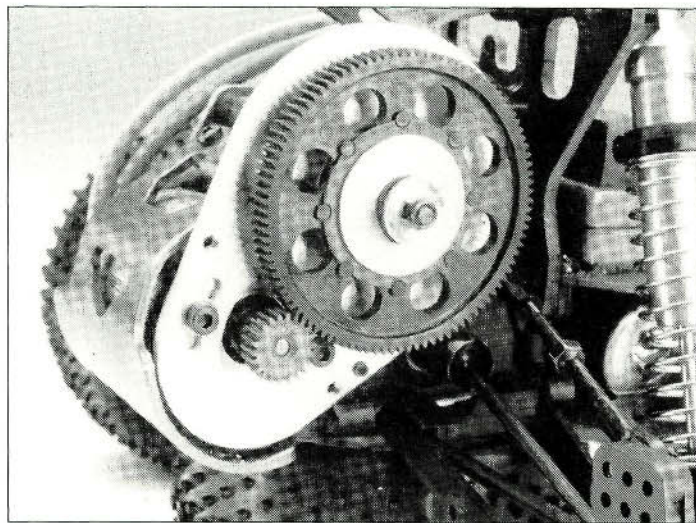
TRIUMPH

The rear suspension arms have adjustable toe-in, and this has turned out to be vital for those who need to cope with varying track conditions. The arms can be adjusted between 1 to 4 degrees of toe-in. The beauty of the design is that, unlike most conventional suspension arms, toe-in is adjusted on the outside instead of at the inner A-arm mount. When toe-in is adjusted at the inner mount, the car's wheelbase is drastically affected, since the arm must be "swung" significantly to achieve the desired toe-in. The greater the toe-in, the shorter the wheelbase. Increased toe-in is primarily used to stabilize handling on slippery tracks; but shortening the wheelbase makes a car less stable! The Triumph's method of adjustment allows the benefits of increased toe-in without shortening the wheelbase.

The Triumph's front suspension arms are also extremely long, but they aren't

its most important feature. The bulkhead to which the arms are attached is a new design that allows the kick-up on the front of the chassis to be adjusted. By using different spacers between the front bulkhead and the upper chassis plate, front-end chassis kick-up can be altered to give 20, 25, or 30 degrees of kick-up. The amount of kick-up will determine how the suspension will react to particular terrain (increased kick-up suits bumpy tracks). Kyosho is also reported to be offering optional steering blocks with various degrees of caster, so you don't have to use the kick-up adjustment to determine the amount of caster in the steering assembly.

The Triumph's steering assembly is similar to that used in the Kyosho Lazer. Instead of the servo-saver being on the main steering bellcrank, it's now installed directly on the servo. The kit includes the servo-saver, which is designed to fit most popular servos. The main steering bellcrank is now ad-



The Triumph's gear is an integral part of the slipper assembly, and it's a true 48-pitch, 100-tooth spur. Note the Team Losi 48-pitch pinion.

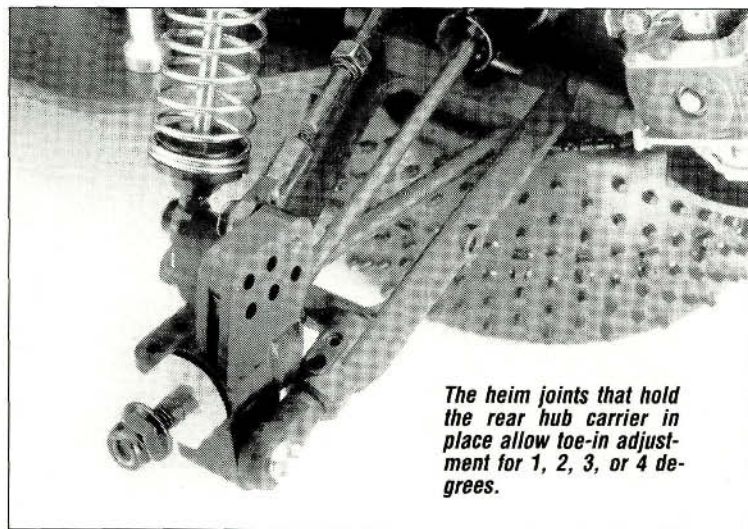
justable, so the servo can be installed across the chassis or running front to back. In the Triumph's chassis, however, the servo must be mounted laterally (across the chassis).

The steering assembly is completely supported by ball bearings, which make its operation supersmooth. The links that are used to attach the steering assembly to the wheels, and the upper camber links on the suspension are all turnbuckles, so adjustments are snap.

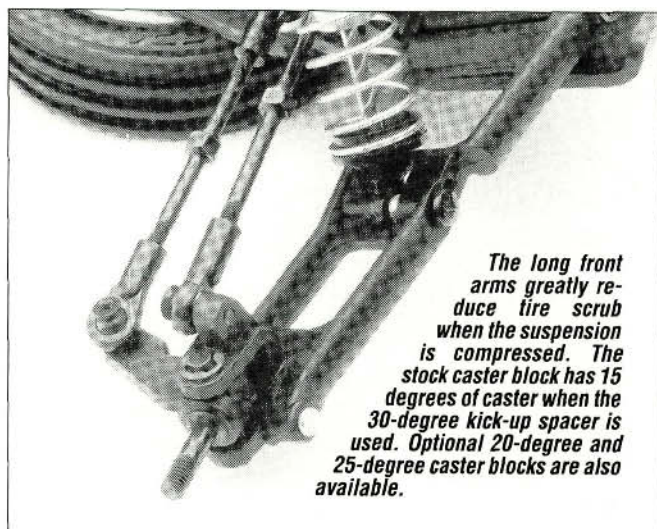
Front and rear suspension damping is accomplished by Kyosho's Gold shocks. The front shocks are of a new design that's 1/2 inch longer than the standard short shock. Their springs are stronger than usual because of the increased leverage the longer arms have on the new shocks.

TRIUMPH TRANSMISSION

The Triumph's transmission is a radical departure from that of the Ultima in that it uses a belt drive instead of the



The heim joints that hold the rear hub carrier in place allow toe-in adjustment for 1, 2, 3, or 4 degrees.



The long front arms greatly reduce tire scrub when the suspension is compressed. The stock caster block has 15 degrees of caster when the 30-degree kick-up spacer is used. Optional 20-degree and 25-degree caster blocks are also available.

"Kyosho hasn't made any bold claims about winning the next World Championships as they did with the Ultima in 1987, but don't be surprised if it happens; this car is capable!"

standard gear drive. It has been found—at least, in the 4WD cars (e.g. Kyosho Lazer, Schumacher Pro Cat and Yokomo Works '91)—that a belt drive is a very efficient way to put power to the ground. The transmission uses a layshaft that has a belt pulley at the top of its housing and a ball differential at the bottom. The version of the car tested here has two 4mm-wide belts, and it has been reported that the twin belts can ride into each other and cause drag. To address this potential trouble spot, Kyosho says the production car might come with one 6mm belt.

Another unique feature of the transmission is that it's designed to keep the car's center of gravity very low for improved handling. The differential pulley actually protrudes through the bottom of the tranny housing, and the motor hangs very low. A hole (which is eventually covered by a thin plastic cover plate) is cut in the chassis to accommodate the low-slung diff.

On the outside of the transmission, the Triumph has a true 48-pitch 100-tooth spur gear. Previous Kyosho cars

had gears that had a metric pitch between the teeth, and they required the use of metric pinions. Apparently, more and more Japanese racers are switching to the standard 48-pitch gears that we use in the U.S., so Kyosho must have decided to meet the demand for them. The new gear can use any of the popular, readily available, 48-pitch pinions.

The spur gear is an integral part of the Triumph's slipper clutch. Hard-coated aluminum hubs sandwich the spur gear between two Rulon disks to provide the slipping action that's necessary to limit unwanted wheel spin. Unfortunately, this design requires that the slipper be readjusted if the spur gear is changed. At the moment, Kyosho is experimenting with slipper designs that allow the spur gear to be changed without altering slipper adjustment, but it's still uncertain whether this design will ever be produced.

Connecting the Triumph to the ground are all-new 2.2-inch rims and tires. It's true that these 2.2-inch rims

aren't yet legal for ROAR competitions, but remember that this car was designed in Japan, where rims of this size are allowed.

The front tires are the standard ribbed design that works well for 2WD racing, and the rear tires have a mini pin-spiked pattern that has a row of "H" blocks down the center line. Finally, a buggy-style Lexan body with a wing mounted to a Lazer-style adjustable wing mount tops off the kit.

Having already built a number of Kyosho cars, I had a good idea of how assembly would go. Kyosho instruction manuals don't usually include a lot of written instructions, but there's always an abundance of illustrations to guide you through assembly, and short notes explain crucial areas.

BUILDING THE BETTER MOUSETRAP

● **Shock absorbers.** Assembly starts with these. The Triumph comes with a number of different shock pistons, and I opted for the four-hole ones. In later tests, I found that Associated 40WT silicone oil in the rear shocks and Associated 30WT silicone oil in the front was a good starting point. Gold springs in the rear and Silver springs in the front are most suitable for average tracks.

● **Transmission.** The diff in the Triumph has new aluminum halves that have replaceable steel rings. Unfortunately, the rings don't fit tightly on the aluminum host pieces, and this can cause them to run slightly out of round. The rings are also an odd size, so they might be more difficult to find at

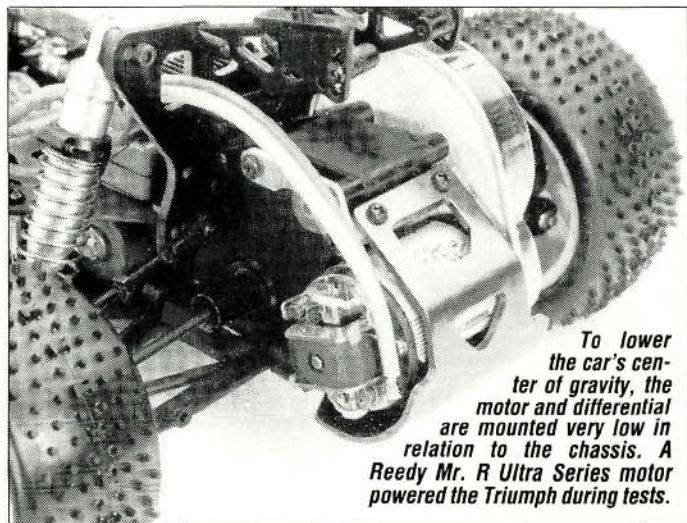
hobby shops come replacement time. For this reason, I installed an MK* Pro Diff kit that was designed for use with Kyosho ball differentials.

The MK Pro Diff kit is similar to the new Kyosho design, but the aluminum pieces are larger, so they support the diff ring better, and their unique design prevents ring slippage without the use of pins. The MK kit also uses Associated Stealth diff rings (included), which should be in abundant supply. With the addition of some tungsten-carbide diff balls, this diff is about as smooth as they get!

MAKING A CHANGE

The only other notable change I made in the assembly was to use a custom DA Graphite* chassis. The U.S. version of the kit will have a graphite chassis, but mine came straight from Japan, where it has a fiberglass chassis. The Triumph's graphite chassis wasn't ready in time for this review, so I had DA Graphite make a graphite unit. Because DA chassis are all made to order, I had a "relief" cut for the transmission diff pulley instead of a hole that would later have to be covered. The plastic cover plate used on many other prototype cars has never come loose, but while I was having a custom chassis made, I figured why not avoid having the hole?!

The strong, double-deck DA chassis is the strongest I've ever seen on an off-road car. It's as strong as a 1-inch-thick chassis plate, but much lighter. Be forewarned, however, that the DA chassis commands a stout price but it doesn't make an appreciable



To lower the car's center of gravity, the motor and differential are mounted very low in relation to the chassis. A Reedy Mr. R Ultra Series motor powered the Triumph during tests.

TRIUMPH

difference to performance. The chassis design is such that it would be very rigid even if made of fiberglass, so don't think you'll have to replace the chassis that comes with the car; it will be *plenty* strong!

For electronics, I installed the new Futaba* Field Force PCM 1024 stick radio with a 9301 steering servo. Trust me when I tell you that this radio has far too many features to mention here, but that it's the most technically advanced radio available—bar none! It has all the interference-free components of the Magnum PCM and more electronic features than the Airtronics 3P. It has managed to convince me that I must revert to driving stick radios, just to take advantage of all that they have to offer. Unfortunately, the FF3's price is up there, so remember that before you run down to the hobby shop.

For a speed controller, I chose the Novak* 410-M1c high-frequency unit. This is the smaller of Novak's two high-tech speed controllers, but many top drivers are finding that the larger units don't pay off in applications with lower amp loads.

For power, I installed a Reedy* Mr. R Ultra Series,

16-turn, triple-wind modified motor. This is geared with a 24-tooth Team Losi* pinion.

TRIUMPH'S FINISHING TOUCHES

The paint-master general, Richard Muise of Motion Graphics*, put the finishing touches on my Triumph. Following our instructions that the body be painted with bright colors, Rich whipped out a dazzling scheme.

Equipped with a few 6-cell SCR (yes, SCR!) packs, I headed to one of the *R/C Car Action* staff's favorite test tracks in Bethel, CT. It's a technical track with tight turns, straightaways and sweeping turns with room to air out the motor. The surface is a medium-bite mixture of clay and sand, which looked ideal for the Kyosho 2.2-inch tires that come with the car.

At home, I had already set the trims and made other necessary adjustments, so the Triumph hit the ground running and was only pulled into the pits to have its batteries changed. During this and many other tests, the Triumph ran true to form. With only minor adjustments to suit different tracks, the car handled as well as any I've driven. Acceleration was very strong

(courtesy of the Reedy motor) and aided by the smooth delivery of the belt-drive transmission.

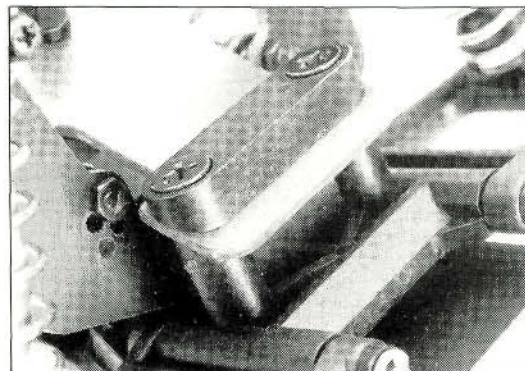
TRIUMPH TROUBLE?

I noticed an area with the potential to be a problem—front-spring tension on the new shocks. The springs are stronger than those usually found on Kyosho shocks, mostly owing to the change in suspension geometry. The increased tension proved to be inhibiting on the more hard-packed tracks. In loose conditions, the car handled superbly, but on the hard stuff, the strong springs caused steering push that made it difficult to get the car through the tight turns under power.

Even in the silver springs, which are the softest of the three available, there was too much spring tension to allow more front-end bite. If this is the car's only major defect, however, I think has a promising future.

TRIUMPH TRIUMPHANT!

My overall evaluation of the



The degree of kick-up on the front suspension can be adjusted by changing the spacer that's just under the upper chassis plate.

car is that it's on par with the best in the world. Just as with any car, there's more to winning than just the chassis. Driving, proper motor choice, gearing, suspension set-up, and dozens of other variables determine a car's performance. The Triumph is good enough to keep pace with any other car as long as the other variables are controlled.

Kyosho hasn't made any bold claims about winning the next World Championships as they did with the Ultima in 1987, but don't be surprised if it happens; this car is *capable*!

**Here are the addresses of the companies mentioned in this article:*
Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

MK Engineering, P.O. Box 216, Seymour, CT 06483.

DA Graphite, 1235 Portola Ave., Spring Valley, CA 91977.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

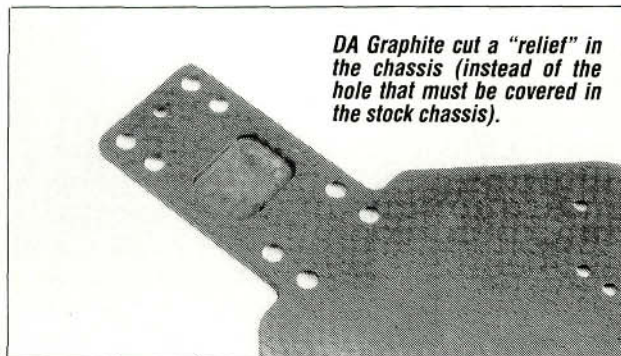
Reedy; distributed by Associated Electronics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

Team Losi, 13848 Magnolia Ave., Chino, CA 91710.

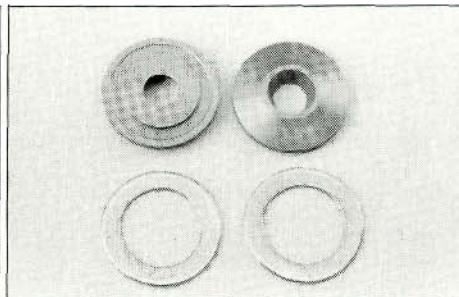
Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

Sanyo Electric, Battery Division, 200 Riser Rd., Little Ferry, NJ 07643.

Litespeed, P.O. Box 4765, Spokane, WA 99202.



DA Graphite cut a "relief" in the chassis (instead of the hole that must be covered in the stock chassis).



MK's slip-proof diff hubs replace the stock units and allow the use of Associated Stealth diff rings.



1. The first step in maintaining your motor is to clean it thoroughly. Use a high-quality motor spray (see above) or a motor "bath" (below center) in which you can actually submerge a running motor. Below: Commutator cleaning sticks are essential to get top performance from your stock motor. Be sure to purchase a comm stick that has low abrasive qualities as well as one that's highly abrasive.

THINGS WERE getting out of hand! Motor timing was up to 45 degrees, and some stock handout motors at sanctioned events seemed to be performing more like 12-turn motors than 27-turn motors. To achieve this kind of performance, people were indulging in all sorts of seedy practices: cranking commutators; replacing the stock motors' Oilite bushings with ball bearings; and some industrious cheaters even went as far as switching the 27-turn stock armature for one with fewer turns of wire.

Motor manufacturers and sanctioning bodies were eventually fed up with the controversy and "timing wars," and they collaborated to produce a new generation of stock motors that are tamper-proof because of a commutator "lock" that prevents cranking; and have saner timing (limited to 24 degrees). With this new stock motor, the driver and the chassis setup become more important.

If you want to be a competitive stock-class racer, it's essential that you properly maintain your stock motor. An average stock motor's life is considerably shorter than that of a well-cared-for modified (mostly be-

stock motor maintenance



2. To clean the commutator, insert a lightly abrasive comm stick into the brush hoods while you spin the armature. Be sure to apply only slight pressure, or the comm stick may distort the commutator's surface.

cause of the inadequacies of stock motors' bushings compared with a modified's ball bearings, and the fact that stock motors' commutators can't be reconditioned). There are ways, however, to prolong a stock motor's life; the following procedures will enable you to keep it running in top form for as long as possible. These tips are neither terribly time-consuming nor technically difficult, so you won't have an excuse for not cleaning your motor properly!

BRUSH UP

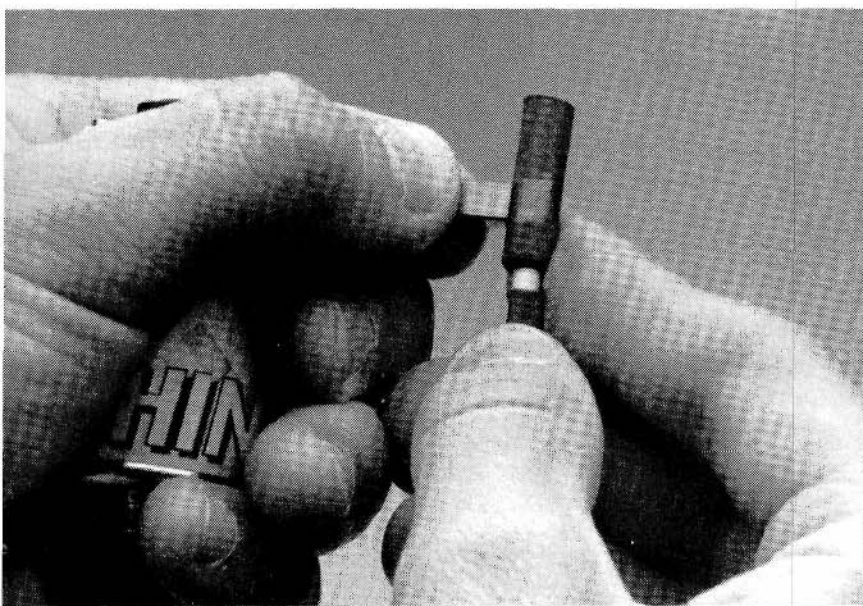
When you clean a stock motor, the first order of business is to remove it from the car. Some of you may gripe about this, but let me assure you that it's essential to a thorough maintenance regimen. Besides, most motor cleaners contain solvents that may attack polycarbonate gear covers and under-trays. When you've removed the motor from the car, take the pinion gear off its output shaft so that you can clean the bushing on the shaft side. Next, remove the brush springs, and take care to put them somewhere safe (like a small parts container) so that you don't lose them. This is doubly necessary when you're trackside.

keep your stocker SCREAMIN'!

by FRANK MASI

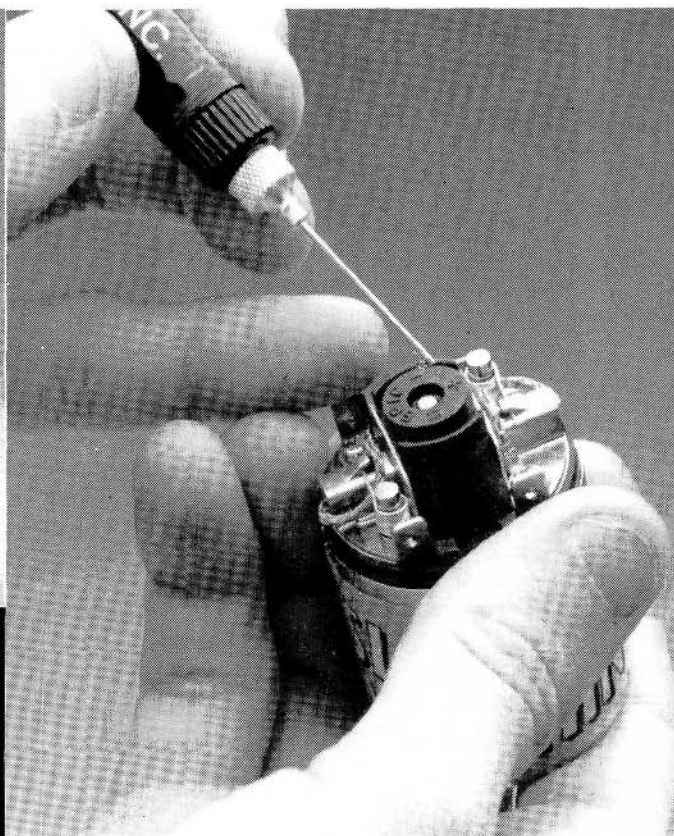
When you've removed the springs, pull the brushes from their hoods, noting their positions in the hood as you remove them. At this point, it's a good idea to inspect the commutator and the

brushes for signs of wear and discoloration. To detect whether a brush is worn, look for a significant reduction in its length. Compare the suspect brush with one that's brand-new.



3. The built-in lubricants in brush compounds can build up to form a "glaze" on the brush surface. Remove this with the round end of an abrasive comm stick. Rotate the stick in the direction that the commutator spins.

4. Before you reinstall your motor, you must put one or two drops of oil on both bushings. If you don't, you may drastically shorten the life of your motor. ▶



stock motor maintenance

Also be on the lookout for nicks or chips (caused by debris) in the brushes.

It's a little trickier to detect wear on the commutator. If you look carefully into the brush hood (with the brush removed, of course), you should be able to see the commutator's entire surface. You'll notice that its surface has a different finish where the brush touches it. If there are burn spots, or grooves worn in the commutator, it may be time to buy a new motor. Of course, with a modified, you can cut the comm on a lathe, but this involves opening

the motor, and we all know that isn't allowed by any race-sanctioning organization.

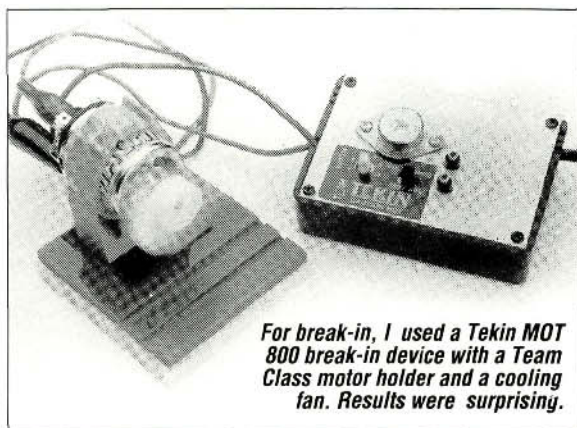
Another sure-fire sign of trouble is discoloration of either the commutator or the brushes—or, even worse—both! Discoloration is the result of arcing between the brushes and the commutator. For example, surface irregularities on a badly worn comm can cause the brushes to bounce—or jump off it—at high revs. The resulting arc burns spots on the commutator, and this significantly decreases the motor's performance, because voltage is inefficiently transferred to the commutator from the brushes. There's not much you can do to fix a burnt comm in a stock motor, but you should definitely replace discolored brushes as soon as possible.

CHEMICAL SPILL

To clean a motor properly, a high-quality motor cleaning spray is essential. Many people claim that motor spray is motor spray, period. I'm here to say that this is a fallacy. The copper wire that's wrapped around the

(Continued on page 122)

power surge



For break-in, I used a Tekin MOT 800 break-in device with a Team Class motor holder and a cooling fan. Results were surprising.

There seem to be two opposing views concerning the break-in period for electric motors. Some say that a lengthy break-in is essential to top performance, while others maintain that a few minutes of low-rpm running are all that's needed to remove surface irregularities on the brushes and the commutator.

With the help of the new LAVco* Pro Dyno, I discovered information that may shed light on this subject.

Armed with the Dyno, a Team Class* motor break-in stand, a Tekin* MOT 800 break-in device, and two out-of-the-box Trinity* Slot Machine stock motors, I tried to determine the effect of a complete break-in on a motor's performance.

First, I put both motors on the Dyno and recorded their performance as they came out of the box. It's interesting to note that both Slot Machines yielded almost identical results on the Dyno; if this is any indication of the equality of the 1991 stock motors, stock-class racing will be fierce this season!

Next, I put the motors in the Team Class motor stand, which comes with a small fan that fits onto the motor's output shaft. The fan provides a cooling breeze to the motor and prevents overheating during break-in.

I then hooked the motors up to the MOT 800, which allows you to run your motors at any speed from a 12V power source. With the MOT 800 set at about 4 volts, I let each motor run for approximately 90 minutes, while I checked periodically for signs of overheating. With the fan, both motors ran cool for the entire period.

When both motors had been broken-in, I put them back on the Dyno and recorded the results. The chart shows the Dyno readings of both motors before and after break-in.

As you can see, at the lower amp settings both Slot Machines were slightly more efficient before they had been broken-in. This is probably because more of the brush's surface touches the commutator after break-in; and this means increased friction. But throughout the entire range of operation, an average of 1,000rpm was picked up after break-in.

Was there a significant improvement in the motors' performance after they had been broken-in? Without a doubt, yes; but whether or not the same results can be attained by simply running the motor two or three times in your car remains to be seen.

Dyno Load Setting (in amperes)	Dyno Reading (before break-in) Motors A & B		Dyno Reading (after break-in) Motor A		Dyno Reading (after break-in) Motor B	
	Power	RPM x 1000	Power	RPM x 1000	Power	RPM x 1000
10	172	18.9	128	20.0	135	21.3
15	266	15.7	240	16.4	256	17.3
20	317	12.8	304	13.2	328	14.3
25	310	9.6	328	10.8	354	11.6



**World's Warm-Up
4WD Champion
Rick Vehlow of
Northern
California.**

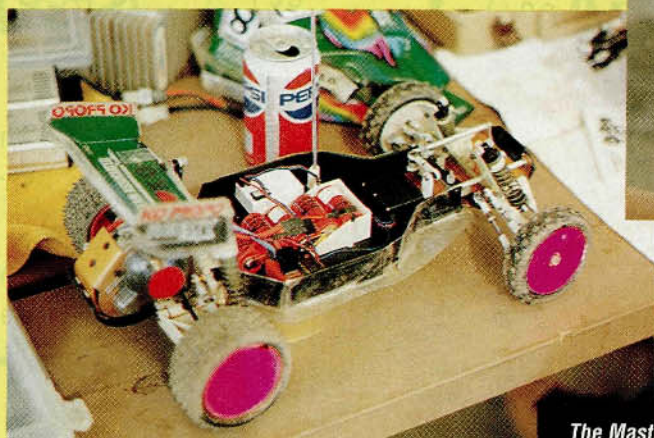
By Thursday, May 30, the official hotel, the Sterling Inn, and the track site at Freedom Hill Park had been invaded by drivers from as far away as Australia, Japan, England, Germany and Switzerland. Of course, most of the top American teams were also on hand. It was quite a sight to watch the faces of unsuspecting locals who came to the park to run their cars and ran into the likes of Masami Hirosaka, Joel



Kevin Orton of Tekin Electronics, Joel Johnson with a "Magic" mouthful, and Jumpin' Jack Johnson—the Motown missile.

Johnson, Gil Losi Jr. and Cliff Lett. They were also pleasantly surprised by the accommodating dispositions of these R/C "superstars" and their willingness to share their time and knowledge.
Five rounds of

T EAM SEMROCC Racing, which will host the 1991 IFMAR Off-Road World Championships in August, set aside the weekend of June 1 and 2 as an opportunity for participants of this year's World Championships to become familiar with the SEMROCC track. Though the track will be changed a little for the Worlds, an amazing number of competitors made the trek for some serious testing.



**The Master—Masami Hirosaka—
and his Reedy-motivated RC10.**



WORLD

by JOHN THAWLEY

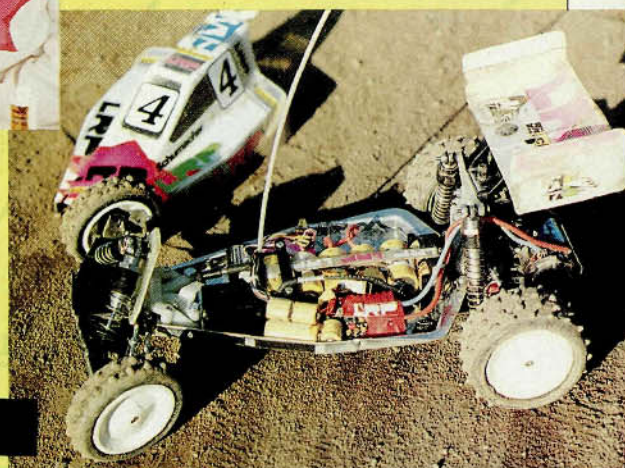


Cecil Schumacher and World's Warm-Up Champion Jurgen Lautenbach of Germany.

qualifying were scheduled for the weekend. A stock class was added to give local racers a chance to take part in the IFMAR activities. Local and regional racers were also allowed provisional slots in the modified classes. Of course, all heats lasted 5 minutes and all classes were for six cells (following IFMAR rules). With the aim of giving everyone an equal opportunity to run



Worlds Warm-up: the road to Detroit



Jurgen's champion Schumacher.



Twister/Kyosho's Kris Moore snickers because he has all the no. 1 decals.

with the "hot shoes," the "heat board" was set up with an overall mix. This type of heat board is never a problem on SEMROCC's massive 26- to 30-seconds-per-lap track.

Most of the U.S. drivers were familiar with the SEMROCC track because they had been at the '89

ROAR Nationals. The circuit had been changed, but it isn't any easier. The track is long, and its continually changing elevation is nerve-wracking to say the least. It's also fair to say that it needed topsoil to bring it up to its '89 Nationals condition. (This will be done in August.)

The scheduled improvements won't change the track's bite or suspension requirements, but they will help to maintain surface consistency from one round of qualifying to the next. Obviously, SEMROCC officials were using this event to "tune-up" also.

As qualifying got

CHAMPS UPDATE

PHOTOS BY JAY BOWMAN



under way, Cliff Lett was quick to establish his stake on the TQ position, nailing down both 2WD and 4WD TQ runs. Meanwhile, defending World Champion Masami Hirosaka was struggling. It seems that the large circuit and demanding surface didn't allow him to throw his car and horsepower around as he usually likes to do. By the end of the day, the three rounds of qualifying truly reflected the heat of the battle. After Saturday's program, the heat boards were shuffled according to qualifying positions calculated with the times of the first three rounds.

STRUTTIN' THEIR STUFF— SOME OF IT!

On Sunday morning, the racers were greeted by rain. With the heat board reshuffled, everyone was eager for the competition to get a little more wheel-to-wheel. When the rain stopped at around 11:30 a.m., the track crew got things in order, and what would have to be the final qualifying round got under way at approximately 1 p.m.

As we expected, the track was up to par very quickly, and drivers fell out of the top 10 at a very disturbing rate. Everyone was going faster and, of course, owing to the shuffling of the heat board, traffic was much tighter. In fact, some of the original top 10 improved their times but still came up short of the A-Main.

Obviously, this was the weekend to try new things but, of course, teams didn't show off all their good stuff. Rick Vehlow accomplished his 4WD victory with his Yokomo Works '91 car. Like most drivers, Rick took advantage of the IFMAR 2.2-inch tire rules and ran Yokomo tires. Reedy's Mr. T 11-turn triple motor seemed to be the popular choice, and it was the choice of Lett and Masami. (Masami also piloted a Yokomo Works '91 car.) It should be noted, however, that Cliff Lett raced with a YZ-10.

The rest of the 4WD field was made up of four Kyosho Lazers and two Schumacher Pro Cats. Joel Johnson ran some serious Trinity horsepower and opted for Kyosho tires. Kyle Reed also ran this combination. Mark Pavidis powered his Lazer with a Reedy motor, while Carlos Gonzales ran with Peak Performance power. The Schumacher Team (Pro Cat) was represented by Jonathan

2WD MODIFIED

Fin.	Qual.	Name	Laps	Time
1	4	Jurgen Lautenbach	12	5:23.74
2	10	Kris Moore	12	5:26.87
3	2	Jack Johnson	11	5:0.50
4	5	Derek Furutani	11	5:0.77
5	9	Carlos Gonzales	11	5:3.94
6	7	Kyle Reed	11	5:6.05
7	8	Jonathan Morgan	11	5:6.76
8	6	Mark Pavidis	11	5:7.84
9	1	Cliff Lett	11	5:9.28
10	3	Rick Vehlow	11	5:9.93

4WD MODIFIED

Fin.	Qual.	Name	Laps	Time
1	6	Rick Vehlow	12	5:2.46
2	4	Jonathan Morgan	12	5:5.63
3	1	Cliff Lett	12	5:13.03
4	9	Carlos Gonzales	12	5:18.79
5	2	Masami Hirosaka	12	5:17.05
6	8	Brian Kinwald	12	5:20.87
7	3	Brad Reelfs	12	5:21.97
8	10	Kyle Reed	11	5:4.89
9	7	Joel Johnson	6	2:34.14
10	5	Mark Pavidis	5	2:1.63

2WD STOCK

Fin.	Qual.	Name	Laps	Time
1	3	Bob Joysey	11	5:0.86
2	1	Frank Calandra	11	5:2.09
3	5	Todd Lewis	11	5:8.01
4	6	Bob Miller	11	5:10.22
5	9	Luther Griffin	11	5:12.31
6	10	Tim Joysey	11	5:15.12
7	2	Pete Costigan	11	5:15.17
8	7	Gregory Sloan	11	5:20.17
9	4	Andrew Power	11	5:22.12
10	8	Jim Bronson	11	5:24.11

Morgan with Reedy power and Brad Reelfs running for Magnum. The Schumacher drivers ran 20x3s on their front wheels and 20x4s on the rears.

Lautenbach managed his win with a Schumacher Cougar, while his own motor, LRP Orange HE, provided the power. His front tires were the Schumacher no. 694, and his rears were the Schumacher four-row no. 687s. Kris Moore came in 2nd with his Kyosho Triumph. His Twister 12-turn motor was anchored to the ground with a combination of Schumacher and Yokomo tires.

Jack Johnson and Kyle Reed piloted the only JRX-Pros that made it into the A-Main, and Jack finished 3rd. Jack's Trinity-powered car was plagued with radio problems while it was in the lead for the first 4 minutes of the race. He ran

Trinity spikes on the front of the car and Losi Naturals on the rear. Reed chose to go with Losi Naturals all the way around.

The rest of the A-Main was made up of the infamous Associated RC10s. Peak Performance powered the cars of Furutani and Gonzales, and Reedy Mr. T's powered the rest. I guess I should point out that the Associated Team wasn't running the "Stealth" car! These were genuine RC10 Team cars! Schumacher fronts seemed to be the popular choice for the RC10, but the rears were another matter: Schumacher, Losi, Yokomo and Associated tires were all represented on the back of the RC10s. Go figure!

I think these were the most "nonchalant" Mains I've ever seen. I was left with the feeling that the qualifying rounds

(Continued on page 98)

HOME-BUILT PROJECT

Pocket Racer

IF YOU THINK that you've seen it all, guess again. This 1/32-scale Lamborghini Countach has fully proportional throttle and steering, and it was built from scratch. All the electronics were either made by hand or have been modified for use in this tiny car. It's truly a home-built project!

Joseph Gaczol started the project when he bought a Monogram* Snap-Tite model of the Countach in 1/32 scale. He soon began to think of ways to turn the model into a fully functional R/C car. After countless hours of searching through his Tower Hobbies* catalogue, Joe found suitable equipment and he began construction.

His first design incorporated the motor and circuit board from a standard Airtronics* servo for the drive system. If you remove the servo gears, you can use the circuit as a crude forward/reverse-type speed controller. This worked fine for a while, but it was slow, and the car stopped after 4 or 5 minutes when the transistors overheated.

In his second design, Joe used the motor from a Kyosho* 1/20-scale car. He installed ball bearings in the motor because the bushings had worn out, and he copied the speed-

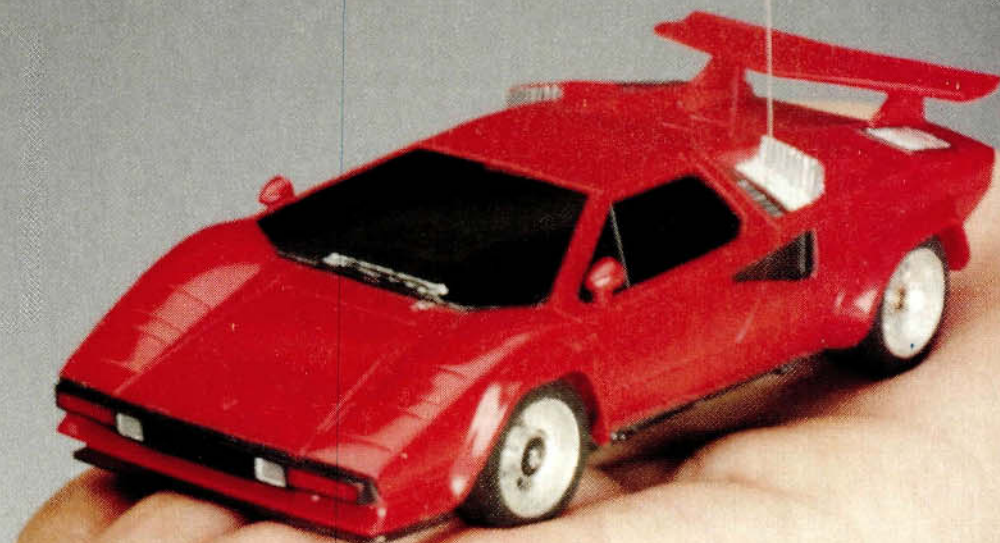
The rear axle is "belt"-driven by a 3mm section of bicycle inner tube. A pulley with 10 grooves for traction

of alignment on occasion.

The car's chassis is made of fiberglass and graphite. The suspension is

they're glued to the arms. Other chassis parts have also been reinforced with graphite strips.

The pocket racer runs off five permanently installed, N-size Ni-Cd batteries. A small Deans* connector in the rear allows you to charge the batteries without removing the body. The pack powers the motor and the radio system for nearly 15 minutes at speeds of up to 10mph. The Airtronics servo was too large, so the



b y J O H N H U B E R

RAGIN' RED POCKET ROCKET!

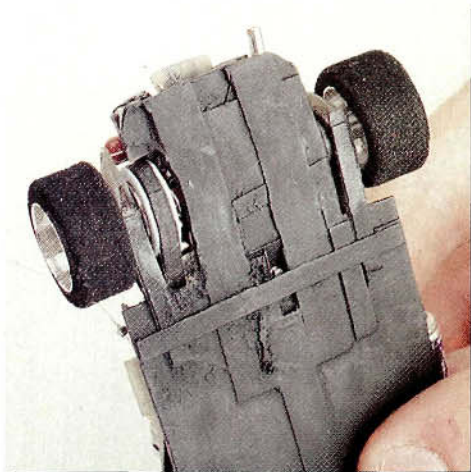
controller circuitry and used it in the Lamborghini. For his next version, Joe plans to use the motor and circuitry from a more powerful servo.

was installed on the motor shaft; and believe it or not, this small wonder has a differential. So far, this seems to be the best drive method, although the belt slips out

provided by small strips of .007-inch graphite glued between the axles and the chassis. In the rear, the strips are glued to the bearings, and in the front

PARTS LIST

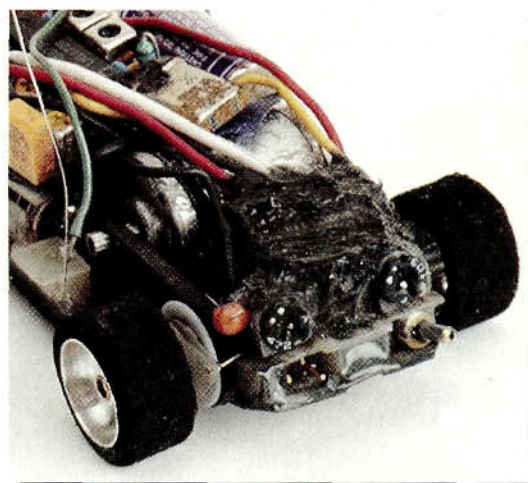
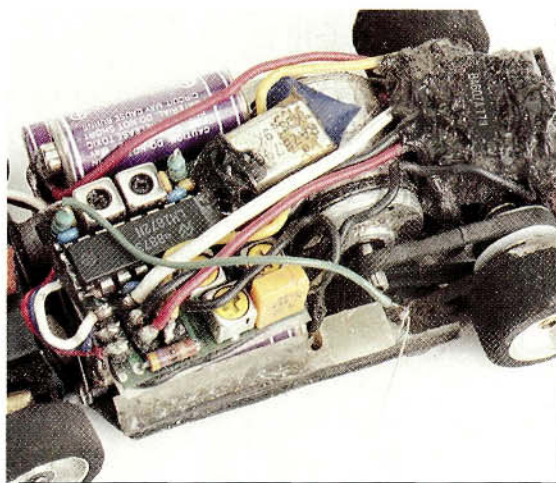
- 1 Monogram 1/32-scale Snap-Tite Lamborghini Countach model
- 1 Airtronics 94501 microservo (without rear of case)
- 1 Tekin micro receiver (without case)
- 1 Airtronics VT2P transmitter
- 8 AA Ni-Cds
- 5 N-cell Ni-Cds
- 1 Kyosho 1/20-scale car motor
- 1 BA607A779 IC chip, power transistors, etc. (for speed controller)
- 1 SPDT microswitch
- 1 set of Deans connectors (for battery charging)
- Fiberglass sheet (.006, .010, .032, .062 inch thick—about 6 square inches of each)
- Graphite sheet (.007 inch thick)
- Aluminum rod (3/4 inch diameter)
- Teflon rod (3/4 inch diameter)
- Nylon rod (1/4 inch diameter)
- Nylon sheet
- Jet instant superglue
- Epoxy (24-hour stuff)
- 3 large eggs (just kidding)



You can see the car's suspension from the bottom of the chassis. Thin graphite strips connect the rear axle to the chassis; they allow slight movement. Note the belt-drive differential.

Right: With the body removed, you can see the modified receiver. Note that all the wires have been soldered directly to the components. The receiver crystal was laid flat to allow the body to fit.

Far right: The custom speed controller is mounted above the rear end, and it's protected from moisture and dirt by silicone rubber. Note the power switch and the charging jack.



bottom half of the case was removed. The exposed electronics were then covered with electrical tape. The Tekin* receiver's case had to be removed so that the

with silicone and fiberglass sheet.

MICRO MOTION

The car's performance is amazing! Steve Pond and I drove it on a smooth floor in the office. The steering response was great, and the car turned around in about a 10-inch radius. The drive-pulley system slipped a little, but worked well when the car was up to speed. The Lamborghini's tail pipe is actually the power switch, and you can access it without removing the body.

I'd be remiss if I neglected to mention the car's great shipping box. It's made of fiberglass and epoxy, and foam rubber held the car tightly in place. A spring-loaded catch released the box's two halves, which could then be slid apart. It

looks as though Joe spent as much time making the box as he spent making the car.

I congratulate Joe on his wonderful project. It really shows what a little tinkering and work can accomplish. And to all the other tinkerers out there—keep us informed. You never know when the Ayatollah will recruit your project for a future issue of *R/C Car Action*!

**Here are the addresses of the companies mentioned in this article:*
Monogram Models Inc., 8601 Waukegan Rd., Morton Grove, IL 60053.
Tower Hobbies, P.O. Box 4021, Champaign, IL 61820.
Airtronics Inc., 11 Autry, Irvine, CA 92718.
Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61824.
Deans Connectors; distributed by ACE R/C, 116 W. 19th St., Box 511C, Higginsville, MO 64037.
Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.



"Stuffed" is the best word to describe this car's radio installation. Note the fiberglass work on the front end.

receiver would fit in the car. All the connections were soldered directly to the circuit board. The bottom of the receiver was then shielded

by JOHN HUBER

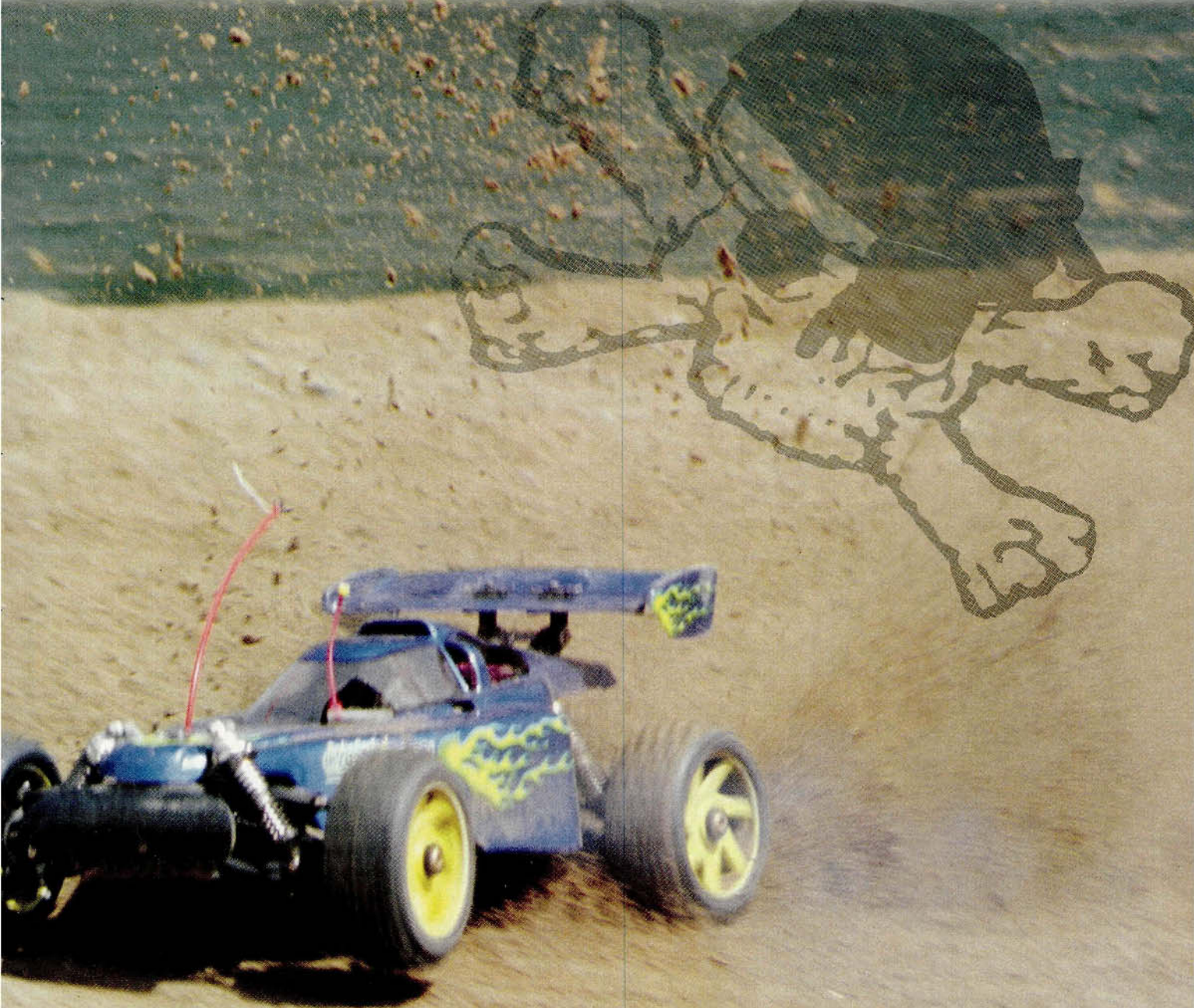
OFNA Pirate

ONE-EIGHTH scale off-road racing is becoming increasingly popular. Since Steve Pond (*R/C Car Action's* editor) reviewed the Kyosho Turbo Burns (October '90 issue), many of our friends have become hooked on 1/8-scale off-road.

When the OFNA* Pirate M1 arrived at the *R/C Car Action* offices, Steve asked me if I'd be interested in doing the review. No need to twist my arm! Warning: if you're planning to try 1/8-scale off-road gas, watch out—it's addictive! Don't expect to have as much fun with an electric car as you do with a gas car. It's like driving a Ferrari and then hopping into a Pinto.

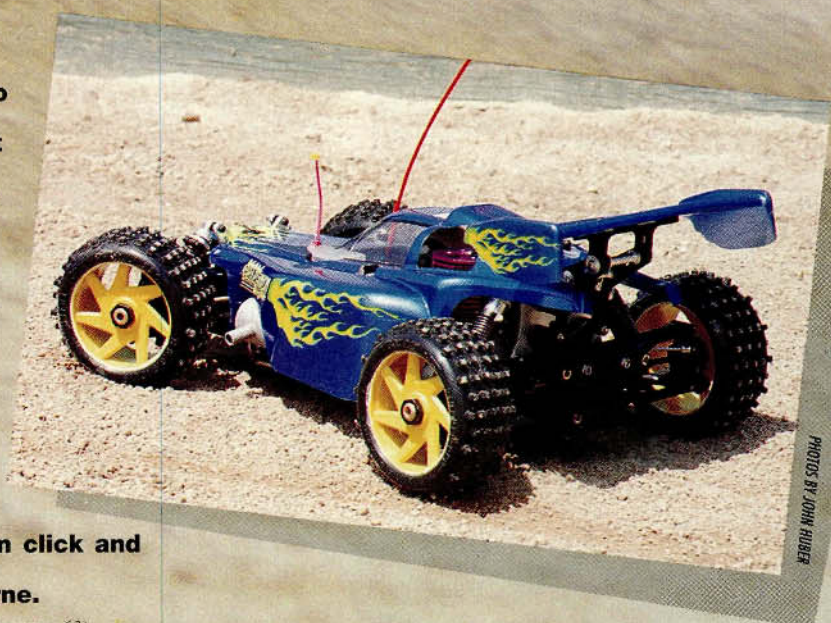
At first, I thought the Pirate was a copy of the Burns, but I was wrong. The cars both feature shaft-driven 4WD, three differentials and an aluminum chassis, but that's where the similarities end. The Pirate's front end is unique. Instead of using separate caster blocks and steering blocks, the Pirate uses a much simpler method. Oilite pivot balls snap into the ends of the front arms. Molded right into the steering blocks are kingpins which fit into the pivot balls. The entire front end is held together by 3mm locknuts that are threaded onto the end of the kingpins. This design is very simple yet sturdy.





Two-piece universals deliver the power to the front wheels. By “two piece,” I mean that the U-joint and the axle are connected to a separate drive shaft by a setscrew. This allows you to adjust their length slightly. Standard dogbones are used in the rear, but front universals can be used if you cut the drive-shaft segments slightly. The rear dogbones are slightly longer than they need to be, and this makes them click and vibrate when rotating while the car is airborne.

(Continued on page 63)



PHOTOS BY JOHN HUBER

D A BOTTLE OF NITRO

OFNA PIRATE M1

Type ... Off-road gas-powered 4WD buggy
Scale 1/8
Sug. Retail Price \$399

DIMENSIONS:

Overall Length 17.5 inches
Width 12.0 inches
Wheelbase 12.5 inches
Front Track 9.75 inches
Rear Track 9.75 inches

WEIGHT:

Gross (with battery) 6 pounds,
 15.54 ounces

BODY:

Type Buggy
Material Polycarbonate

CHASSIS:

Type Pan
Material Aluminum

DRIVE TRAIN:

Primary Pinion/spur with
 centrifugal clutch
Transmission Center planetary diff
Differential(s) Planetary
Bearings/Bushings Ball bearings

SUSPENSION:

Front/Rear: Type Lower A-arm/upper link
Damping Oil-filled coil-over

WHEELS:

Front/Rear: Type One-piece plastic
Dimensions (DxW) 3.18x1.63

TIRES:

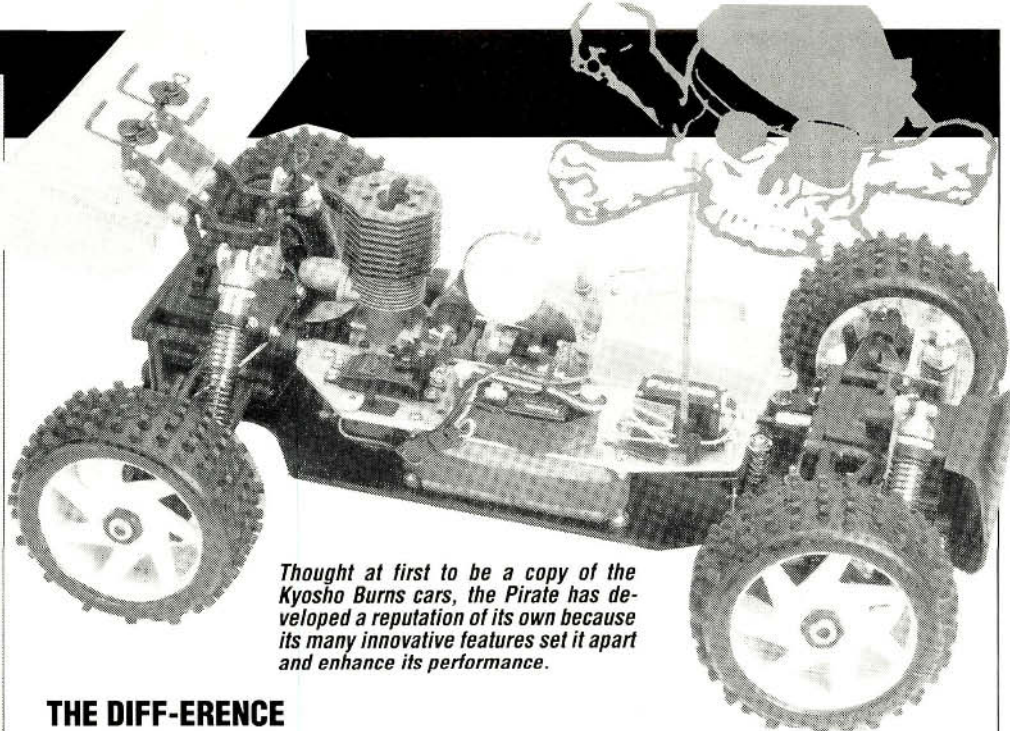
Front/Rear Square spikes

OPTIONS AS TESTED:

Futaba PCM 1024 with two S9301 servos;
 Leo .21 VB PRO engine; 6V 1000mAh receiver battery; Hayes* fuel filter, Fox* Miracle glow plugs.

COMMENTS:

Building the car was a piece of cake. The original instructions are vague in some areas, but the supplied revision will answer your questions. The Leo engine can be mounted in the car with a special flywheel, but any .21 engine can be adapted easily with the adjustable motor mounts. As with any model engine, proper tuning takes some getting used to. If you get frustrated, relax, and seek help from someone with experience. Very few problems will prevent a model engine from running; 90 percent of the time, the cause is an improperly adjusted carburetor.



Thought at first to be a copy of the Kyosho Burns cars, the Pirate has developed a reputation of its own because its many innovative features set it apart and enhance its performance.

THE DIFFERENCE

Unlike the Burns, the Pirate M1 has three planetary gear differentials.

This type of differential is very

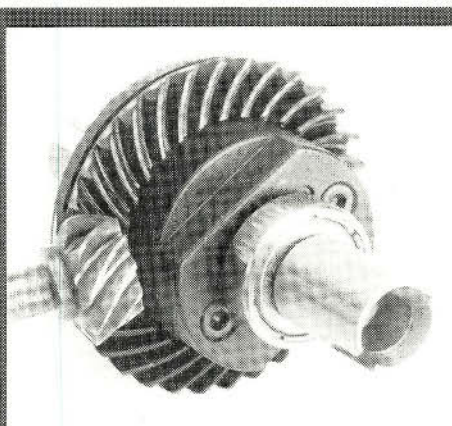
strong and reliable, and it rarely needs servicing. The center diff has no provision for adjustment other than using thicker grease.

Though this stiffens the diff action, the grease eventually flings out and frees up again. The center differential has a motor-driven molded nylon gear bolted to it. From there, power is delivered to the front and rear differentials by means of dogbones.

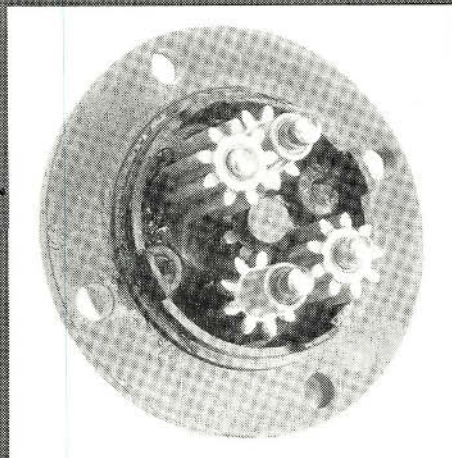
This brings me to another of the Pirate's features: it has helical-cut

gears instead of straight-cut gears for the ring and pinion. Helical-cut gears have two important features: first, the teeth

don't all engage simultaneously; there's a smooth progression from tooth to tooth, and this results in a smooth, quiet gear mesh; second, the curved teeth have more surface area than standard gears, so they're stronger. The helical ring gears for the diffs are made of molded plastic, but hardened-steel gears are available if you need them.



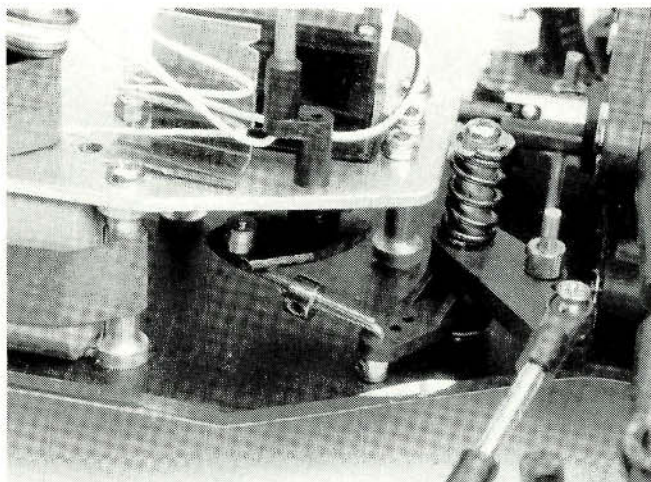
The Pirate's helical-cut gears are unique. The small steel gear meshes smoothly with the nylon diff gear; for increased reliability, a steel diff gear is available.



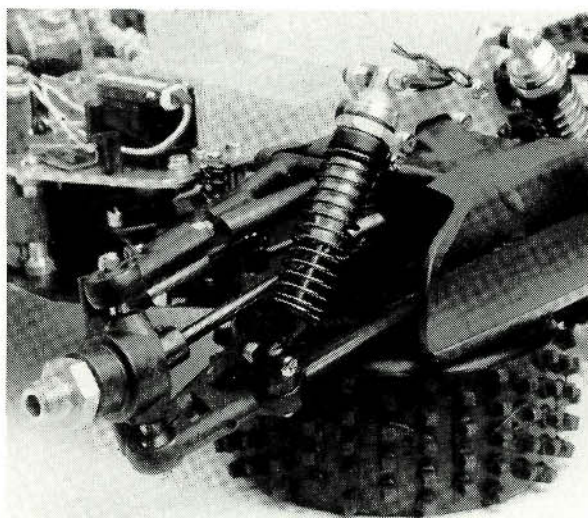
For smooth operation, all three differentials are the planetary gear type. To stiffen diff action, use thicker grease.

CONSTRUCTION

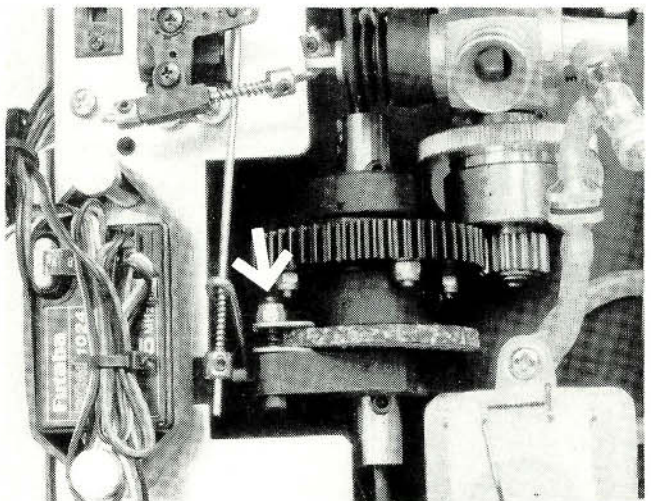
The Pirate is easier to build than you might think. It's a sophisticated machine, but you don't need a degree to build it! Because the Pirate is 1/8 scale, its parts and screws are larger than those on most electric cars. The instructions, how-



The steering linkage is a little weak for my taste, but it worked. To be safe, I filed the chassis slightly where the collar met its edge.



Note how the kingpins fit through the pivot balls in the arms. This system is much simpler than a suspension with separate caster and steering blocks.



ever, could use some work. One photo that was supposed to show the completed chassis was *reversed*! I quickly realized this, but it did throw me off at first. Assembly took approximately 8 hours, even though I took my time and was sure to apply thread-locking compound to every nut and bolt. I recommend Loctite* 271 (red) for the engine mounts and other semi-permanent parts. Use Loctite 251

(blue) for areas that you'll disassemble frequently. You must use heat to loosen a part that has been treated with the Loctite 271.

HEY, LEO!

I used the Leo* .21 Pro engine, which appears to be a copy of the O.S. EXB, but it has a purple cylinder head. To mount the clutch assembly on the engine, you must first take a few threads off the tip of the crankshaft. Use a Dremel tool and a fiber cut-off wheel, and

always wear eye protection !! Sparks will be shooting off the crankshaft, and there's always the chance that the wheel will break loose, so you really should wear face protection, too. If you can't find anything else, use an old Lexan car body (the thicker the better), and put it over your face with the windshield over your eyes. You may

look funny for a few minutes, but at least you won't get hurt.

TIME TO WALK THE PLANK

I drove the Pirate for the first time in the street. I asked Steve to help me crank it up because he has had much more experience with .21 engines. After about 30 minutes of tinkering, we had the car running smoothly and it was time to drive. Getting the transmitter back from Steve wasn't easy! We drove the car back and forth, sliding it into every pile of sand or dirt that we could find.

After we had used a couple of tanks of fuel, I decided to call it a day before my spike tires became slicks. Later, when I tried to mount the body, I noticed that the chassis was slightly bent. Apparently, when the car hit a

**Without the
down time
that you encounter
with electrics,
the driving was
non-stop.**

pothole, the aluminum plate's front end was tweaked. I solved this by bending it against the edge of a table, and I added a fiberglass brace

to prevent it from happening again.

The following day, Steve and I put the Pirate to the test when we took it out for a few hours to shoot some action photos. I realized that the wing wouldn't last very long, especially with Steve driving it "full bore." The wing is the same thickness as the wings on most electric cars, and the Pirate's weight and speed was too much for it. We put about four tanks of fuel through the car with no problems, though.

Left: The center diff delivers power to the front and rear wheels. Braking is achieved by two plates that clamp the brake disk (see arrow).

The following Saturday, I went to a local track with two friends who own Turbo Burns to see how the Pirate would compete. We stayed at the track for about five hours, until we were exhausted from running. Without the down time that you encounter with electrics, the driving was non-stop.

MODIFICATIONS

As with many of my other cars, I felt the need to modify the Pirate. Although no other companies make parts for the Pirate, OFNA (the Pirate's importer) carries hop-up parts (like hard-anodized shocks) that will increase performance. The shocks supplied with the kit are high-quality, machined-aluminum, but because they're untreated, they wear internally during hard use. The hard-anodized versions last a long time without any signs of wear.

A custom center diff and a machined center gear are also available. The gear is the same size as the standard plastic gear in the kit, but it's made of *machined* nylon for increased strength and smoothness. The custom center diff is actually not a diff at all. The unit delivers full power to both the front and rear wheels, but allows the front to freewheel when power isn't being applied. This makes the car handle like the 4WD electric cars I've driven, but the front brakes are lost. I'll figure out some way to make front brakes, but for now, I'll have to live with rear brakes only. Other modified parts are the aluminum center diff and brake mounts. The kit comes with two plastic mounts that work well, but the aluminum ones are far more rigid and have ball-bearing supports for the brake lever.

The aluminum chassis that comes with the Pirate is very good right out of the box. All the mounting holes have been completely countersunk, and the chassis comes anodized in black from the

(Continued on page 98)

Team Astro Sweeps The WORLDS

In Truck Pulling and Drag Racing Astro Motors are almost unbeatable. Astro motors have powered more trophy winners than all other makes combined.

IEDA Drag Racing World Championships Drag World Colton, Ca. Mar.1,2,3, 1991

National Speed Records

2.013 Sec.....Pro CompJohn MillsAstro Top Fuel I Motor
2.033 Sec.....Top Fuel FunnyCalvin GrantAstro Top Fuel I Motor
1.986 Sec.....Top Fuel RailMike OgleAstro Top Fuel I Motor

IEDA World Winners

1st Place.....Pro CompCalvin GrantAstro Top Fuel I Motor
2nd Place.....Pro CompJohn MillsAstro Top Fuel I Motor
1st PlaceTop Comp ElimMike RussoAstro Top Fuel I Motor
1st PlaceTop Fuel FunnyM.R. OgleAstro Top Fuel I Motor
2nd Place ..Top Fuel FunnyEric WeimsAstro Top Fuel I Motor
1st Place.....Top Fuel Dragster ...Alan MaynorAstro Top Fuel I Motor
2nd Place....Top Fuel Dragster ...Rick Albiscos.....Astro Top Fuel I Motor
2nd Place....Unlimited Dragster .Roger RoseAstro Top Fuel II Motor

NR/CTPA World Championships Champaign, Il. Sept. 30, 1990

1st Place..... 2WD Modified.....A. JanickiAstro Pullmaster I Motor
2nd Place ... 2WD ModifiedDutch EsgroAstro Pullmaster I Motor
3rd Place 2WD Modified.....David HesterAstro Pullmaster I Motor
1st Place.....2WD Open IKyle Haynes.....Astro Pullmaster I Motor
3rd Place....2WD Open IMarcia Arman ...Astro Pullmaster I Motor
1st Place.....2WD Open II.....Jim Bee.....Astro Pullmaster II Motor
2nd Place....2WD Open II.....Scott Weigel.....Astro Pullmaster III Motor
3rd Place ... 2WD Open II..... G. KinseyAstro Pullmaster II Motor
1st Place..... 4WD Open ISean CullenAstro Pullmaster I Motor
2nd Place.... 4WD Open IDon Fisher.....Astro Pullmaster I Motor
2nd Place ... 4WD Open II.....Dale ArmanAstro Pullmaster II Motor

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days of



IN THE MOVIE "Days of Thunder," the Mello Yello Lumina stock car roars across the finish line with Cole Trickle (Tom Cruise) behind the wheel. Paramount Pictures puts you in the driver's seat of a NASCAR racer, letting you feel the impact of hitting a wall at more than 200mph and the excitement of reaching victory lane.

Now, thanks to the efforts of Parma International*, the Days of Thunder cars can be yours—albeit in slightly smaller versions! Choose one of the movie's three Lumina cars: the Hardee's (no. 15071), City Chevrolet (no. 15072), or Mello Yello (no. 15070). The cars in the Days of Thunder Series are designed to run on parking lots, sidewalks and driveways.

report

by FRED MURPHY

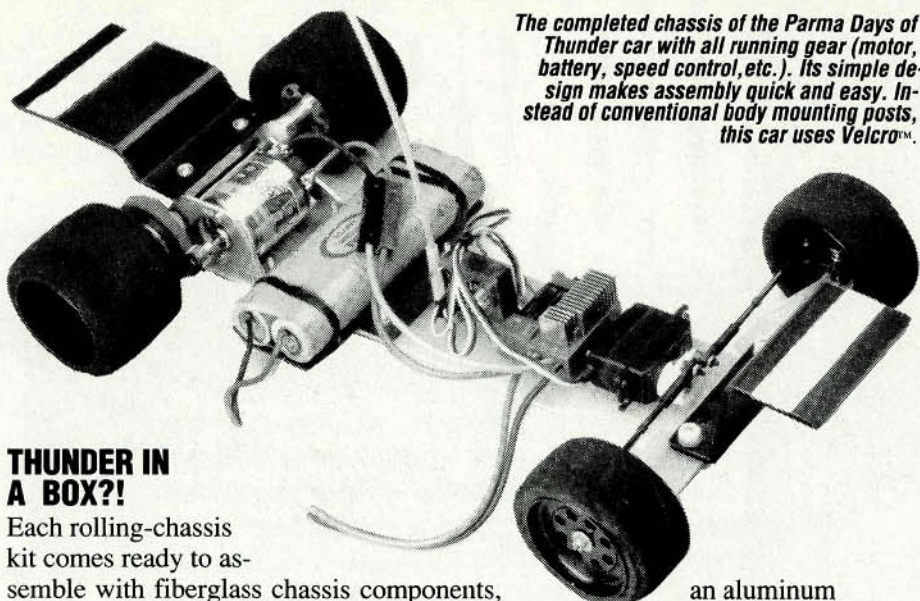
T
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storm watch

days of thunder



The completed chassis of the Parma Days of Thunder car with all running gear (motor, battery, speed control, etc.). Its simple design makes assembly quick and easy. Instead of conventional body mounting posts, this car uses Velcro™.

THUNDER IN A BOX?!

Each rolling-chassis kit comes ready to assemble with fiberglass chassis components, rear pod, a ball-type differential with a 48-pitch

spur gear, aluminum rear hubs, a steel axle with metal bushings, black, stock-car-type wheels with foam, an aluminum low-profile tires, a clear Lexan Lumina body with a complete decal sheet, and—of course—instructions. You choose the motor, radio, batteries and speed controller.

The Mello Yello rolling chassis kit comes in a colorful box (with a handle), which doubles nicely as a garage. The contents were in two sealed bags, each with its own inventory/description sheet. The two instruction sheets describe assembly and decal placement. The body has excellent detailing and scale realism, and the decal sheet was so complete that I only needed one paint color for the body—black. The bodywork was breeze.

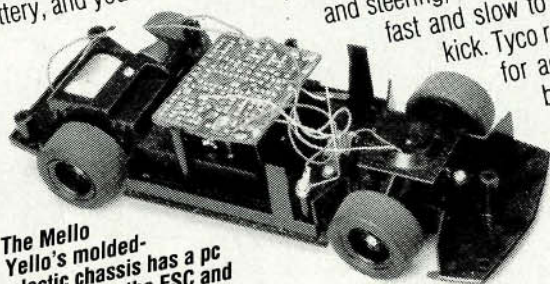


The thrill of driving a Days of Thunder stock car can now be enjoyed by even the youngest fans. Tyco R/C* presents a pint-size version of the Mello Yello full-size NASCAR stocker for the driveway racers in every neighborhood. This 1/16-scale car is available with two choices of frequency, so two can race at the same time.

The car comes with a small, two-stick transmitter that controls forward, reverse and steering. The set includes five pylons, so you can set up a mini racecourse to build and test a youngster's driving skills. You only have to supply four AA batteries and one 9V battery, and you're off and running.

coming soon to a driveway near you!

This version doesn't have proportional throttle and steering, but it does have a switch for fast and slow to give it some extra kick. Tyco recommends this car for ages eight and over, but I know a 3 1/2-year old who was able to drive it in no time!



The Mello Yello's molded-plastic chassis has a pc board that's the ESC and receiver combined.

BUILDIN' UP A STORM!

The chassis assembly instructions are short and to the point—three basic steps: chassis, front end and rear end. Basic experience with R/C cars is helpful here, because there are no set-up hints, no electrical-system diagrams and no maintenance tips. I assume these cars are aimed at beginners, and they need more help than this!

The chassis is a simple, flat, 2 1/2 x 1 1/2-inch fiberglass piece that has nine holes for mounting the fiberglass front crossbar, the rear

aluminum pod and the battery tray. Assembling the main chassis should take no more than 30 minutes.

In Step 2, you glue the front tires onto the rims, and the instructions suggest that you use a fast-drying superglue (CA). I recommended that you use an adhesive that's specifically for mounting foam tires, because you'll have much more time to position the tires before the glue sets. If you can't find any tire adhesive, pick up some contact cement and lacquer thinner at the local hardware store. Coat both the inside of the tire and the outside of the rim with the cement, and let it set according to the instructions. After it has set, saturate it with the lacquer thinner and mount the tire on the rim. The thinner will allow you to make adjustments until it evaporates.

Next, install the kingpins. To ensure that they'll operate freely, you'll have to sand them with 600-grit sandpaper or a finer grade. Sand them until they slide freely through the spindles. Don't attempt to drill out the spindles; if you do, you could easily ruin them.

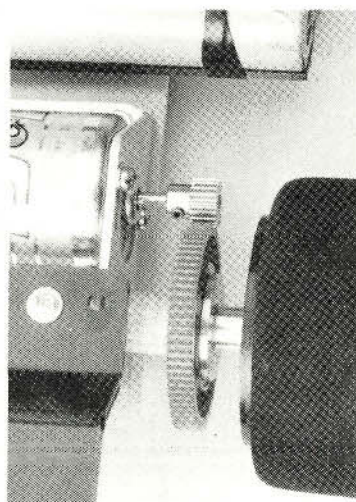
With the kingpins and spindles in place, move on to installing the tie-rod and mounting the steering servo. You'll have to drill the holes for the servo-mounting posts, or if you prefer, use double-sided servo tape. I decided to replace the supplied, traditional Z-bend tie rods with Du-Bro* 4-40 adjustable turnbuckles and rod ends. They make steering smoother and more responsive, and they facilitate fast adjustments while increasing front-end strength.

In Step 3, you assemble the rear end. Glue the rear tires onto the rims in the same way as you attached the front tires. Then assemble the ball differential; take your time here, if you want it to work properly. The instruction sheet's diagram is very small, and you have to match part numbers with the inventory/description list to make sure the shims and washers are in the correct positions. Also be sure to apply a little diff lube to the differential balls. (It isn't supplied in the kit.)

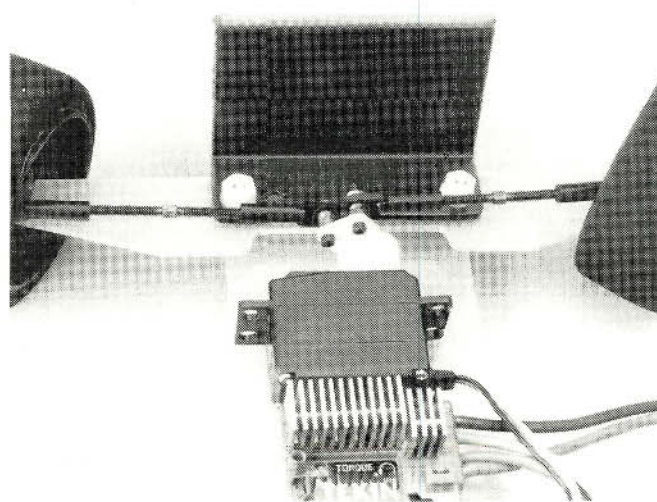
With the rear end and axle assembly complete, spin the rear wheels manually to make sure there isn't any friction; they should spin as freely as possible.

(Continued on page 110)

"Assembling the main chassis should take no more than 30 minutes."



The rear end of the Days of Thunder car features an aluminum motor mount and ball-type differential.



To strengthen the front end, the author replaced the kit's Z-bend linkage with Du-Bro's rod ends and turnbuckles. Although the front of the Days of Thunder car has a coil-spring suspension, the rear has none.

SPECIFICATIONS

Type On-road
Scale 1/10
Sug. Retail Price \$119.95

DIMENSIONS:

Overall Length 19 inches
Width 8.75 inches
Height 4.25 inches
Wheelbase 10.5 inches
Front Track 8 inches
Rear Track 8.25 inches

WEIGHT:

Gross (with battery) ... 62 ounces

BODY:

Type Lumina stock car
Material Polycarbonate

CHASSIS:

Type Pan
Material Fiberglass

DRIVE TRAIN:

Primary Pinion/spur
Transmission Direct drive
Differential Ball
Bearings/Bushings Oilite
bushings

SUSPENSION:

Front: Type Fiberglass crossbar
Damping Coil-spring
Rear: Type None

WHEELS:

Front: Type One-piece plastic
Dimensions (DxW)
..... 1.75x1.25 inches
Rear: Type One-piece plastic
Dimensions (DxW)
..... 1.75x2 inches

TIRES:

Front/Rear Low-profile foam

ELECTRICS:

Motor, Battery, Speed Controller Not included

OPTIONS AS TESTED:

Futaba Magnum AM radio; Futaba S132H High-Speed Servo; Tekin TSC 410S speed controller; Tekin TERX 75 AM receiver; Parma 7.2V matched Sanyo racing pack; B&R* Modified 05 Motor.

COMMENTS:

This car can best be described as "street smart." It has the fine scale look of the Grand National cars made famous in the movies. It wouldn't survive on a racetrack, but it's a lot of fun on driveways and parking lots, where its excellent body detailing and fine graphics will make heads turn.

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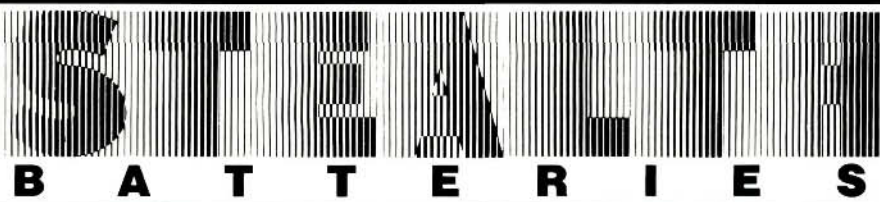
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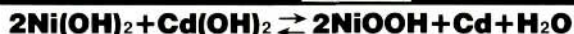
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TESTAROSSA

(Continued from page 32)

Robbe model (*R/C Car Action*, April '84), the Kyosho car doesn't include a cockpit interior or an optional lighting system. I painted the body with Pactra's* Racing Red spray paint, and I tinted the windows with Dahm's* Smoke Instant-Tint.

TESTING

Since the Testarossa will probably be built by beginners, I think it's worthwhile to run through some of the basics for those of you who might require some trouble-shooting tips. First, make sure your Ni-Cd battery is fully charged. Check your transmitter power; if you use rechargeable batteries, check their charge, too. Check all the wiring and connections before each run. Remember, these cars are being run on asphalt and other hard surfaces at considerable speeds. It doesn't take a hard hit to loosen a connection or scrape through and short a hanging wire.

For an out-of-the-box car that wasn't designed as a serious racer, the Testarossa handled surprisingly well. The car cut tight turns and ran true on the straight-aways. The rotary-style mechanical speed controller performed well and didn't bind or stick once on our first few runs together. The tires really stuck well—probably equivalent to full-scale VR's at scale speed.

Up front, the supplied servo-saver assembly looked as if it would be adequate, but during my first runs, it began "un-snapping." After reviewing the instructions, I learned I had left off the bushing collars that fit between the saver and the top chassis plate. After installing them correctly, the problem disappeared.

As for looks, nothing compares to a nicely detailed Testarossa—full scale or 1/10 scale. From its long sweeping lines to its cheese-cutter side ducts and extremely wide stance, this car is truly one step beyond. I guess I'll keep mine in the garage next to my Ford Probe GT. After all, I have the bargain of the century: I can always find a parking spot and women love it; so what if I can't use it for transportation? I'll say it's too valuable to drive around, if anyone asks! Look for more coverage of the Scale Car Series in upcoming issues!

*Here are the addresses of the companies that are mentioned in this article:

Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61824.

Pactra Inc., 620 Buckabee St., Rockford, IL 61104.

Dahm's, P.O. Box 360, Cotati, CA 94931. ■

TROUBLESHOOTING

by STEVE POND

Illustrations by JIM NEWMAN

BEATEN BY A BELT?

I've been racing a 1/10-scale Kyosho McLaren Honda on an indoor carpet track. During races, the idler gear between the motor and the transmission often snaps under the stress of a modified motor, because the motor gear has fewer teeth. I'm stuck with a 32-pitch gear from OEM. In Japan, there's a belt-conversion kit with pulley. Is there a similar kit available in the U.S.?

I also have a Tamiya Ferrari F189. Its foam tires are too hard to stick to an indoor carpet track. I can convert the front with regular foams with bearings, but I can't do this with the rears because of the hub's weird design.

Are there any adapter conversion kits?

EDWIN LEE
Wayne, NJ

I don't know of any kits that will allow you to convert Kyosho scale cars to a belt drive. A number of companies sell belts and pulleys; you might be able to get the proper parts from them. As for the F189's tires, the foams that come with the kit will stick well to most carpet tracks. If traction is still a problem, try any of the popular traction compounds. If you still don't have enough traction, switch to another foam compound. I don't know of any adapt-



ers for attaching pan-car wheels to the Tamiya cars, but you can mount your own foams on the Tamiya wheels. Stock replacement wheels are available from MRC and most hobby shops (you may have to order them). Mounting any of the popular foam compounds right on the Tamiya wheels, should solve your problem.

ERROR HORROR!—UNBEARABLE BEARING

I own a stock Rampage with an O.S. .12 CZR engine. My engine ran well until I received a notice from Hobbico. They said there had been an assembly error and sent me a tiny one-way assembly that would solve my problems. Just before this arrived, when I pulled the starter, the clutch bell moved, too, and I could actually turn the wheels when I pulled the starter.

I took apart the clutch assembly to find the clutch shoes and strap badly damaged. I was sent some new parts, but I never received a strap. I looked at an exploded view and didn't see a strap, so I put everything back together then replaced the one-way assembly with the new one. This made my problems worse! Whenever I pull the starter rope, it recoils very slowly; sometimes, not even all the way. It's difficult to get the engine started, and when it does start, it dies after a couple of seconds. I'm really confused about that little strap on the clutch and the slow recoil of the starter rope.

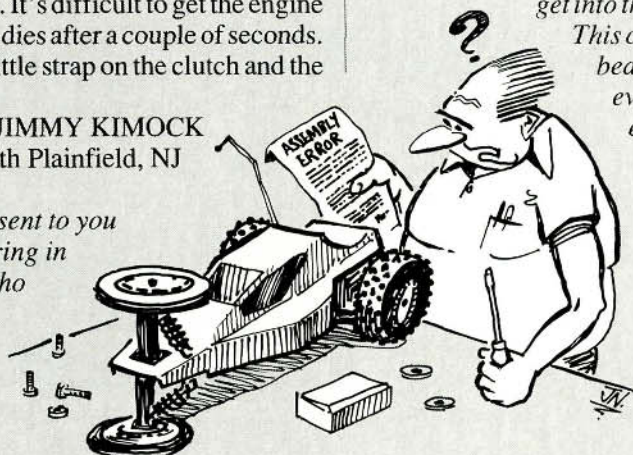
JIMMY KIMOCK
North Plainfield, NJ

The one-way bearing that was sent to you was a replacement for the bearing in the pull-starter assembly. Kyosho found that the bearing that had been included with the car caused problems and opted to send new ones to customers who already owned the

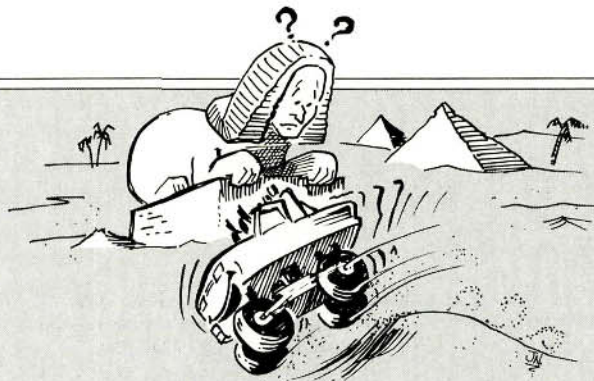
car. Your starter-recoiling problems resulted from removing the E-clip on the rear of the starter housing to replace the one-way bearing. It's not necessary to remove this clip when installing the new one-way bearing, but it's hard to know that you shouldn't remove it to replace the bearing until it's too late. By removing this clip, the pre-load on the spring in the recoil starter is lost, and this prevents the starter from winding the cord back in all the way. For information on how to wind up the recoil spring, call Hobby Services at Tower Hobbies.

Your clutch problem is unrelated to the pull starter. The wheels spin when you pull on the starter because of binding in the clutch bearing. You might have allowed too much dirt to get into the assembly and neglected to clean it.

This can damage the bearing. A bad clutch bearing will cause misalignment and, eventually, extensive damage to the entire assembly. Replace the bearing in the clutch bell, and don't worry about the "strap." It's actually a liner that's put on the inside of the clutch bell for the clutch shoes to ride on. It was found, however, that the liner caused the clutch to engage too quickly. By removing the liner, the clutch slips longer, and this allows better overall performance.



If you have a technical problem that your hobby shop or racing friends can't resolve, give us a shout at Radio Control Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to Troubleshooting, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.



TRUE GRIT OR FULL OF IT?

I have a Blackfoot with bearings, an MC 112B ESC, a Thorp ball diff and counter gear and a Speedworks 427. To keep the ESC cool, I have to run an 8- or 9-tooth pinion, but when it's really cool outside, I can run a 10-tooth pinion. In the March '91 R/C Car Action, I saw the Robinson Racing Products ad for 32- and 48-pitch cluster gears, and it sparked my curiosity.

If I bought a 32- and a 48-pitch gear, could I take the metal gear off the 32 and install the 48 in its place to make a 48-pitch pinion-to-spur/32-pitch spur-to-Thorp-diff super gear? Is this feasible? Would I need to do any "surgery," or could I cheat and use the metal half of my Thorp counter gear with the Robinson 48-pitch gear? If it would work, would the half-and-half setup allow me to gear up at all?

Another thing that contributes to heating

my ESC is that 50 percent of my backyard track is made of an old sand pile. I know sand makes motors work harder and, as a result, the ESC gets hot, so before I run on my track I hose it down. Would it still be a problem?

Am I sane for wanting to try this, or is it even worth the hassle? I hope you can help me!

JOEL JACOBSON
Snohomish, WA

Thorp Mfg. makes counter gears for their differentials, but they're both designed to be used with 32-pitch gears, and they're only available with standard and overdrive ratios, not underdrive, which you need. You might be able to modify one of these counter gears to take a standard 48-pitch spur gear. The metal part of the Thorp counter gear is actually two pieces that are press-fit together. If you can work the two pieces apart with a punch of an ap-

propriate size and light taps with a hammer, you can replace the original 32-pitch spur gear with a 48-pitch gear of your choice. (The 48-pitch gear, however, will have to be modified to fit.) Even with the 48-pitch gear, the ratio may not be suitable for what you're trying to do.

Another—less painful—alternative is to attach a Stormer or Bolink gear-reduction unit to your truck. The unit comes with a 2-to-1 reduction, but it can be altered by swapping one of the 48-pitch pinion gears for a more suitable reduction ratio. Motor rotation will have to be reversed, but this is easily done by loosening the endbell screws and rotating the endbell 180 degrees. Endbells can only be rotated on a modified motor. If you'd like to run a stock-class motor with the gear reduction, Trinity is the only company I know of that offers a reverse-rotation stock-class motor.

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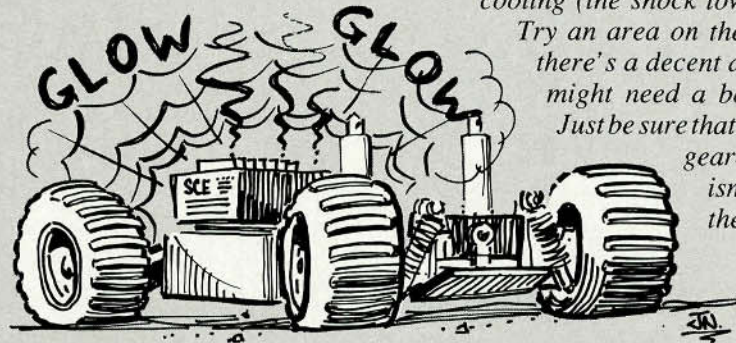
TROUBLESHOOTING

GLOW TO GO?

I have a monster-truck converted RC10 CE with a Futaba 112B ESC. I've recently been running a Trinity Speedworks Monster Mash motor with an 8.4V battery. My speed controller gets so hot that I can't touch it. What should I do?

BRAD GALLEHER
Brighton, MI

The MC112B wasn't originally designed to take the abuse of a 7-cell battery and a hot modified motor. More power to you if you're not having any problems, but I recommend that you put the speed controller where it will receive the most cooling (the shock tower is a no-no).



Try an area on the chassis where there's a decent airflow, and you might need a body scoop, too.

Just be sure that you aren't over-gearred and that there isn't any binding in the drive train.

TAKIN' A DIVE!

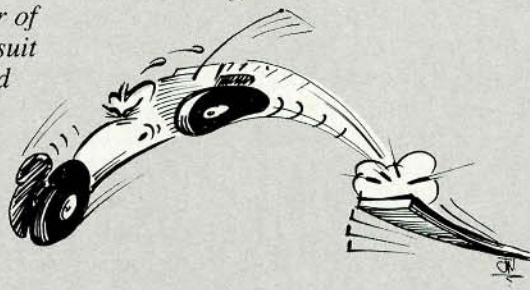
I have an RC10 with an aluminum pan, and I've had trouble with it nose-diving off jumps. My front shocks are as stiff as I can get them. I've tried backing off the throttle before I hit a jump, but the car still nose-dives. In an attempt to stop this, I added Andy's wide front A-arms and TQ wheels and tires to its front, but they didn't help. How do racers prevent their cars from doing this? Is it my car, or am I making this happen?

TOM BINGENHEIMER
Orange, CA

Your problems are probably the combined result of both the car and the driver. It's best to start with the car; then work on your driving. First, you should be using 30WT oil in the front shocks and either 20WT or 30WT oil in the rear shocks (preferably, Associated's silicone oil). The kit's silver shock springs are the lighter of the two that are included, and they suit most applications. This setup should eliminate the possibility that the chassis is contributing to the flipping problem.

As far as your driving is concerned, backing off the throttle is the worst thing you can do. When you let off the

throttle, weight is transferred to the car's front end, so it becomes nose-heavy when it's airborne. If the jump is mild enough for you to maintain constant throttle, try it a couple of times and see what the result is. If the car still goes nose-down or is too fast, there's another approach. If you must slow down to clear jumps safely, to keep your car's nose higher in the air, brake before you get to the jump, then, as you make the transition from the track to the jump, get back on the throttle. This will transfer weight to the rear end, and that will keep the nose high. When the wheels leave the ground, the freely spinning tires also have a torque effect that pushes the nose even higher. Give it a shot, and let us know how you make out. To save wear and tear on the tranny, be sure to let off the throttle slightly before the car hits the ground.



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b y J I M S H E P K A

nEVER LET IT be said that the Europeans don't meet a challenge. Corally*, which has long been known for its products' prowess on carpets and roadcourses, has entered the very competitive market of high-banked oval racing. Its engineers have been burning the midnight oil to come up with after-market products for the big tracks.

Although superspeedway racing is unique to America, the oval craze seems to be catching on in the rest of the world. One of Europe's most popular on-road cars is the Corally SP-10. It was designed for road racing, and it would have a hard time competing with today's LTO-type cars on high-speed, banked, oval tracks. Now, in an attempt to get in on the oval craze, Corally has produced an LTO conversion for the SP-10, and it includes many of the features found on purpose-built oval cars. Using a stock SP-10 as a starting point, I wanted to see how it would fare—with mods—on the superspeedway scene.

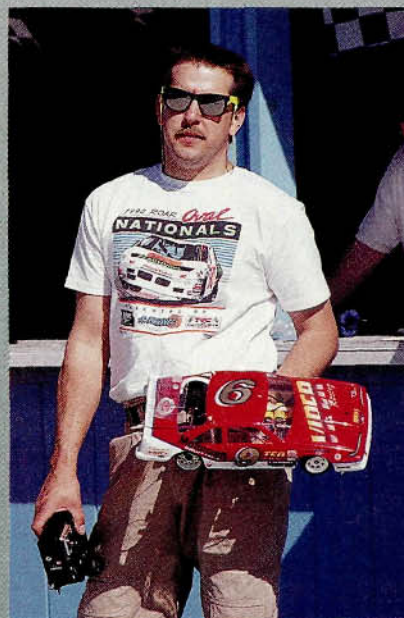
UPDATES

I began by taking the suspension components off the stock chassis plate. This was easy because Torx screws (T-10) are used throughout the car, and I needed only one tool. These screws, and the extensive use of nylon E-clips and rubber O-rings, make it easy to "snap" the car apart—stripped to the bone in minutes! I laid out the pieces neatly in front of me, and then I quickly reassembled the car using the new oval parts.

(Continued on page 83)

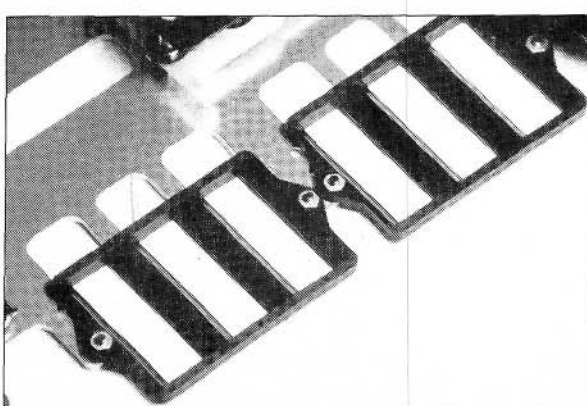
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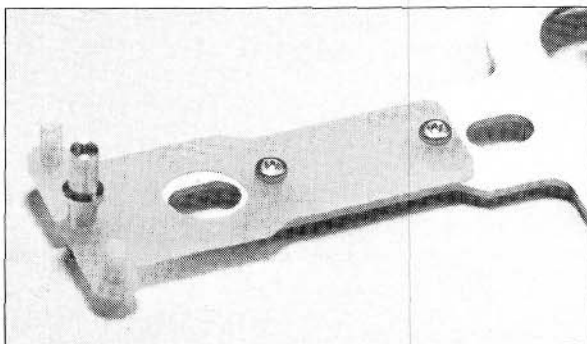


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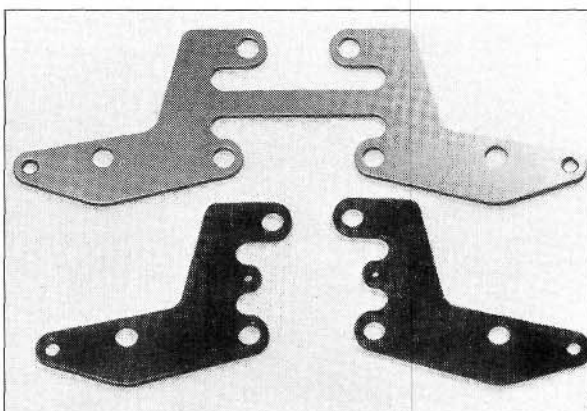
The batteries aren't strapped to the chassis with tape. The Corally has a tray into which the cells are glued. The tray can be screwed into different positions on the chassis to alter the car's weight bias.



Bolted onto the T-plate is the new Corally tweak adjuster, which allows the chassis to be tweaked for left bias.



The SP-10's new front end pieces make its front suspension independent. It also makes the front end softer because there's no longer a center piece acting as a sway bar.



The chassis plate is of the "left-turn-only" variety, but it can be run on a roadcourse. There are six battery slots (three along either side), and the unique, Corally battery hold-down system (the cells are glued to special adapters and fastened to the chassis) allows for the correct weight bias to suit track conditions. Although I'm not a fan of this battery-holding system, it works quite well on this chassis because there are three distinct battery-mounting locations: six all on one side; on the plate's left side, right next to the T-plate (like most LTO designs);

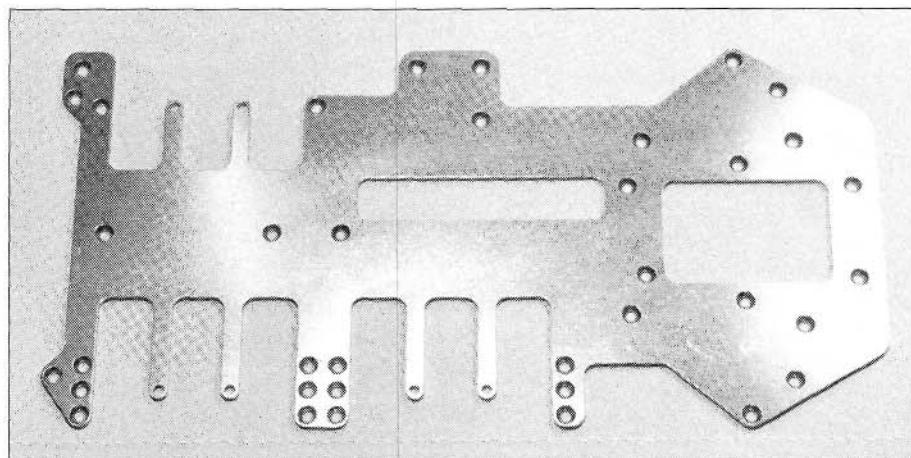
or outboard, almost directly in line with the left kingpin for more left-side weight bias—a "trick" setup.

The update kit also has a three-piece front-suspension assembly that replaces the stock one-piece unit. When the sus-

10

pension blocks have been secured to the chassis, separate A-arm assemblies are set in place and attached with large nylon E-clips. A graphite center brace mounted between the A-arms controls chassis roll (somewhat like a sway bar). The center brace is bolted into place, but for this application, I decided to leave it off to use the car's independent suspension fully. With the new A-arms in place, I attached the kingpins, the steering blocks and the linkage assemblies, and having reassembled the front end, I turned my attention to the rear.

One of the major complaints about the SP-10 was the lack of "tweak" adjustment. Corally never thought it a problem, but hey, we



Underneath the new left-biased Corally chassis. Note that the cell slots on the right side have been retained, and that the left side cell holders can be adjusted to alter weight bias. This new chassis weighs much more than the stock one.

SP-10

know better (right?), and they responded by introducing a bolt-on "tweak" adjuster. Instead of redesigning the standard T-plate, Corally opted to add this package. It's bolted directly to the T-plate, and you can increase or decrease rear bite by using the different mounting holes. Tweak is set with two nylon grub nuts that are attached to the front of the bolt-on tweak adjuster (similar to an Associated 10L). After I did that, I attached the upper damper plate and reassembled the drive train.

Corally axles, drive cones and rims are the company's own design, so you're somewhat limited as to available compounds. Since Corally components aren't always readily accessible at your local hobby store, its engineers introduced adapters to fit BBS-type rims. The stock SP-10 front axles are larger than most and are tapered to accept only OEM rims. Simply by popping off a large nylon E-clip, you can remove the stock axle and replace it with one that will accept any number of standard tire/rim combos (e.g., from TRC, Bolink, etc.).

The rear axle presents

PARTS LIST

CORALLY

- Oval chassis plate (left turn only)
- Independent front A-arms
- Tweak adjuster
- BBS wheel adapters (front and rear)
- Wing mounts

PARMA

- T-Bird body

FUTABA

- PCM 1024 transmitter
- S132-H servo

TRC

- T/M radials (gold dots)

NOVAK

- NER-3FM 3-channel narrow-band FM receiver (75MHz)
- T-1X electronic speed controller

MAX-CELL

- SCE 6-cell

TRINITY

- Hand-wound, 11-turn, triple motor

a different set of problems, but these, too, have been addressed. The stock setup incorporates a unique drive-cone/rim (there's no hub) that can be snapped together (with incredible tolerances) and held on the axle with—you guessed it—an E-clip! Instead of that, the special Corally rim, a spacer and a wheel adapter are fitted into place, and a BBS rim is mounted in reverse and press-fit over the drive cone. It sounds complicated, but it really works quite effectively. With all the components back in place, it was time to go racing!

THE TEST

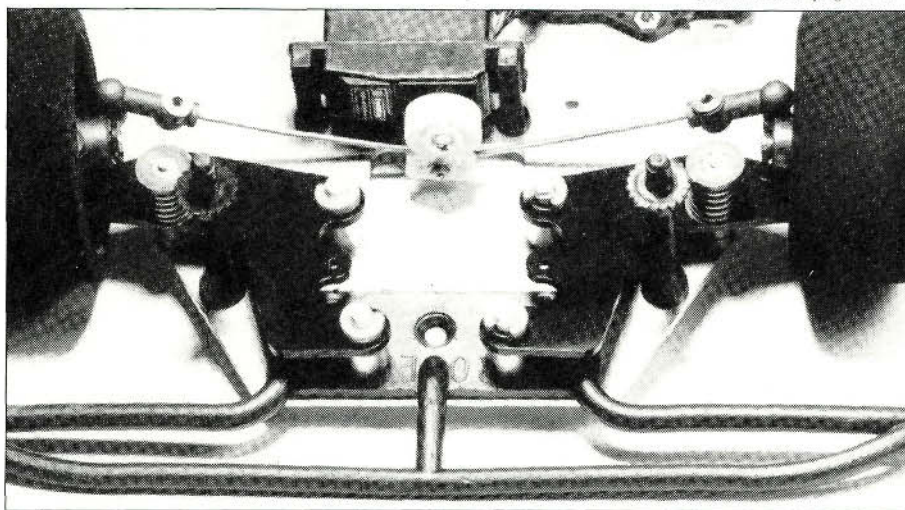
I ran the SP-10 at Megatrax (one of the largest superspeedway facilities in the country) in Browns Mills, NJ, at one of their weekly races. With the help of my brother, Ted, I set out to dial-in the car.

First, we had to change over to radial

tires, and this proved to be quite a chore. The fronts went on OK (with the use of the axle adapters), but we had a heck of a time fitting the rears over the drive cones. According to my calculations, the TRC radial rims' diameters are much smaller than foams, so we spent a considerable time on trying to make them sit properly. After a lengthy struggle, we eventually installed an older set (the rims had a larger diameter). After checking the ride height and chassis tweak, we mounted a Parma T-Bird body and attached a single-stage wing using Corally's wing-mounting system.

During the initial warm-up, we used very mild modified motor because we wanted to check the radio gear and get the general feel of the car. After just a couple of laps, I noticed that the front end was bouncing too much, so I tightened the front springs. The

(Continued on page 112)



The new front end pieces are a drop-in replacements for the earlier ones. Note the Pro-Line bumper that protects the front end.

ZERO-LOSS IS BOSS

by JOHN RIST

THERE'S A NEW contender for the title of "best connector." Connectors' features have always been a tradeoff between performance and convenience. The convenience of having connectors on your battery packs is obvious every time you want to change a battery pack in 30 seconds or less. That they reduce performance is understood by serious racers, who eliminate this loss by directly connecting (hard wiring) both the battery and the motor.

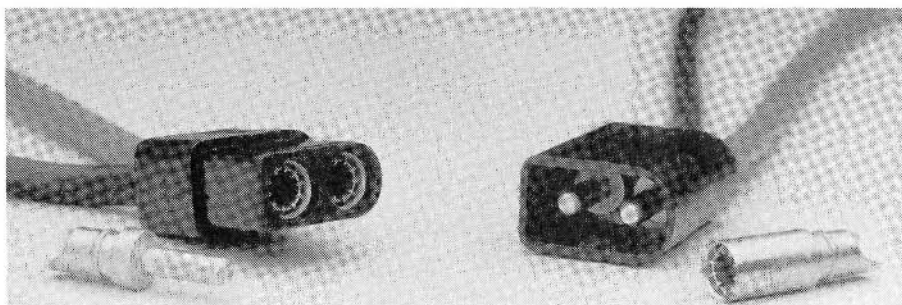
In my last "Connector Inspector" article, the Sermos* Power Pole and Litespeed* connectors easily won the connector war, but since then, Team Astro* has introduced a new connector that they claim has zero voltage loss and is capable of handling a true 100 amps. The throttle jammers among you who have been following my tests during the last year or so know that when you pass 100 amps through connectors, they get hot, most will melt, and all the shrink-wrap will be burnt off the battery packs. I headed to the "Scoping Out" lab to heap connector-inspector abuse on the Zero-Loss Racing Connectors.

ZERO LOSS?

I first wanted to test Team Astro's claim about zero voltage loss. To do this, I connected a 2.5-foot-long piece of 13-gauge monster wire (Stage III* Super 13) into the setup that I use to measure speed-controller resistance. I then put two needle probes on the wire, 2 feet apart, and took a voltage reading between them. The current was set at 12 amps.

The voltage drop turned out to be 0.055

volt, which is a resistance of 0.00458 ohm (voltage divided by current equals resistance). I soldered one set of the connector's contacts to the middle of the monster wire. The voltage drop along the 2 feet of wire with the contact installed was 0.056 volt—a resistance of 0.00466 ohm. This is virtually no difference! Also take into consideration that this reading is liable to error because the last digit on any digital measuring device has an uncertainty of $\pm$ one count. This means that when a digital voltmeter reads 0.056 volt, the voltage in question might be 0.057 or 0.055 volt. Nevertheless, it was obvious that this is very close to being a zero-loss connector.



Team Astro's new connector tops the charts

100A CAPACITY?

Team Astro also claimed a true 100A capacity for this connector. To run the 100A test, I installed both sets of contacts in the connector's shell using the usual monster wire—the one I used in the resistance test.

I looped the connector back on itself so that the current would flow through one of the contacts, through the loop and back through the other contact. I then put a Litespeed connector (to mate with my battery pack) on the remaining loose ends of the monster wire. When I connected the Zero-Loss connector across the bat-

tery pack, the current jumped to 119 amps. At 20 seconds, it dropped to 80 amps; at 40 seconds, to 68 amps; and at 60 seconds, there were 24 amps of current flowing. During this, the covering burnt off my battery pack and the wires became too hot to handle, but the Zero-Loss connector stayed cool—clearly, one good connector! In fact, it's the best connector that I've ever tested, so it's definitely the connector king.

BUT WAIT!...THERE'S MORE!

When you've installed it properly on its wires, it's impossible to connect the Zero-Loss connector backward. (Remember that the number-one destroyer of speed controllers is a "reverse-connected" battery pack.)

...ANY BAD NEWS?

This connector's only drawback is its price—a suggested retail of \$9.95 for a pair. To make matters worse, the male and female halves of the connectors are completely different, so you can't put both of the halves that come in the package on a battery pack, so the connector costs \$9.95 for each battery. Of course, the other one in the pair goes on your speed controllers and battery chargers, but if you have six to 10 battery packs, equipping them could be expensive. (Team Astro's Bob Boucher says that the halves are available individually: \$2.99 for the male half; \$6.99 for the female half.)

A KING AMONG CONNECTORS!

So there you have it!—a new winner in the connector wars. If you're involved with heavy truck-pulling, high-voltage boats, or high-voltage airplanes (all of which have high current requirements) and you want quick-change battery

capability, the Zero-Loss Racing Connectors will definitely work, and work well. They eliminate the need to decide between performance and convenience: with the Zero-Loss Racing Connector, you can have both.

**Here are the addresses of the companies mentioned in this article:*

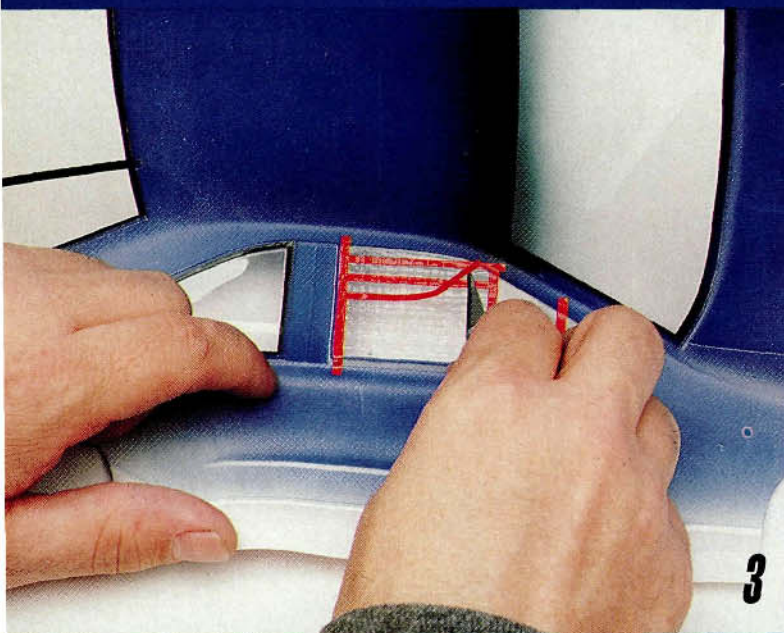
Sermos R/C Snap Connectors, Cedar Corners Station, P.O. Box 16787.

Litespeed, P.O. Box 4765, Spokane, WA 99202.

Team Astro, 13311 Beach Ave., Marina Del Rey, CA 90292.

Stage III, 1189 Chicago Rd., Troy, MI 48083. ■

▶ Before you start detailing, clean off the paint overspray using a solution of two parts nail-polish remover and one part rubbing alcohol.



▲ You can use thin pinstriping tape to make window netting and windshield hold-down clips.



During trimming (see the July '91 issue), I scored the T-Bird's wheel wells with a hobby knife, but I didn't remove the plastic from these areas until I had painted the body. Carefully tear along the scored lines.

After you've painted a car's body and removed the masking, you can enhance its appearance by adding some details. First, clean any overspray off the body's exterior. A cleaning solution made of two parts nail-polish remover and one part rubbing alcohol will work well, and it won't harm Lexan. *Don't* use undiluted nail-polish remover; it's too strong and might damage the Lexan. Apply the cleaning solution to a clean cloth or a cotton ball, and gently wipe off the overspray. Continue to use clean areas of the cloth (or clean cotton balls), and re-apply the solution after every 15 seconds or so, because it loses its effectiveness after that.

Don't let any of this solution touch the body's interior (or, for that matter, anything with a finish on it) because it will attack the paint.



To duplicate the small sponsor stickers used on full-size NASCAR stockers, I used Autographics decals. They come perfectly aligned on a sheet, so you don't have to cut and position them individually.

T-BIRD TRANSFORMED!

After you've thoroughly cleaned the body, remove the material from the wheel wells. When I trimmed the Associated*

T-Bird, I scored these areas with a hobby knife. (See "Cut and Trim Lexan" in the July '91 issue.) I left these pieces in place during the painting process because they help to keep the body rigid, and they protect the surrounding areas from overspray. To remove them, start at the edge of the body, and carefully tear away from the scored side.

Body Detailing

by RICHARD MUISE

WELCOME TO part four of Car Action's series on finishing Lexan bodies. In the previous installments, Motion Graphics'* Richard Muise discussed body masking, design layout and painting using spray paint and airbrushes. (See also the July, August and September '91 issues.) In this, the final chapter, Richard discusses detailing painted bodies to give them an "extra touch" of realism.

You can create many small details using a fine-point permanent marker and drafting templates.



PHOTOS BY YAMIL SUEO

concours



After you've finished cleaning the body, it's time to add the details that will make it stand out in the crowd. Using thin black pinstripping tape, I gave the T-Bird window straps, safety netting and windshield hold-down clips. To make realistic hood pins, I cut out small disks of Coverite* Presto self-adhesive chrome covering with a hole punch, drew clips on them with a fine-point marker and put them in the appropriate places.

You can use Autographics'* sponsor decal sheet to duplicate the small sponsor stickers used on the sides of full-size NASCAR stockers. These decals are arranged properly on the sheet, so you don't have to cut and position them individually. To recreate the large Coors, Melling and no. 9 stickers found on Bill Elliott's full-size T-Bird racer, I turned to Custom R/C Graphix.* This company uses computers to custom-cut vinyl decals that are easy to apply. They're aligned and spaced on a "carrier sheet," and you apply

them simply by rubbing them with your fingernail or a burnishing tool. These graphics are also available in versions that can be applied to the inside of the body. You can leave them on or remove them like masking after the body has been painted.

It's easy to add body seam lines (e.g., those found on the hood, trunk and doors) using a fine-point permanent marker and a flexible straight-edge. On some bodies, you don't even need to use a

(Continued on page 120)



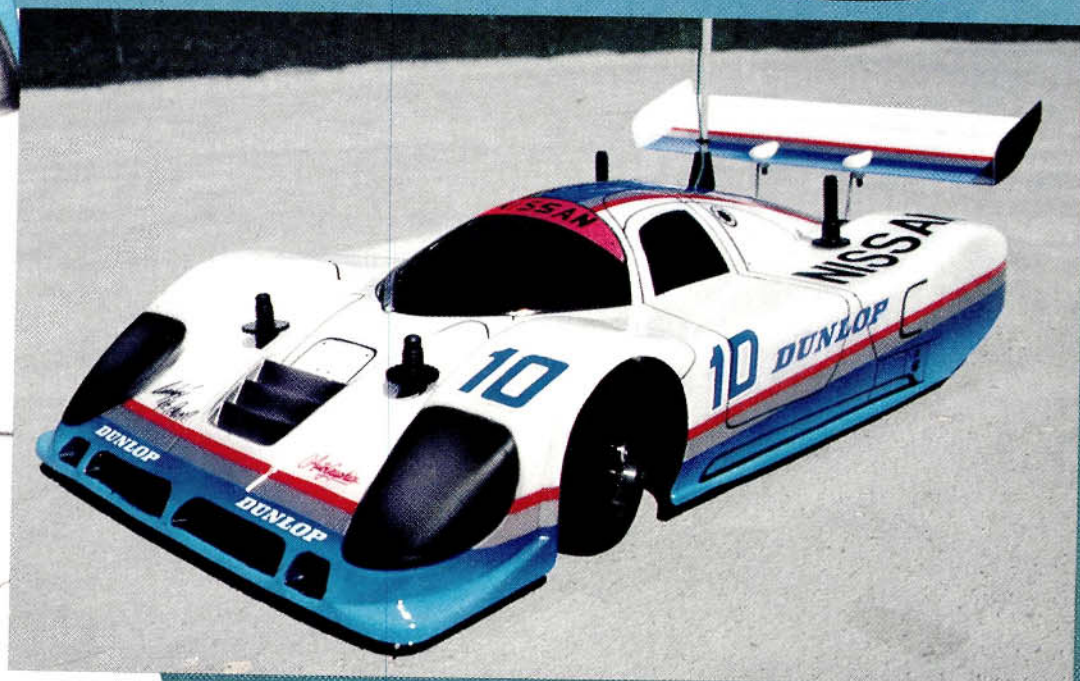
▲ To simulate full-size hood pins, I used a hole punch to cut small disks out of chrome Coverite Presto. I drew the "pins" on with a fine-point permanent marker.



Using the techniques outlined in this series, it's easy to make your R/C car bodies look sharp.

clean-up

corally



WITH THE TREMENDOUS leap in the popularity of $1/10$ -scale on-road racing and the consistent interest R/C racers have always had for $1/10$ -scale off-road, $1/12$ -scale on-road racing seems to have been largely forgotten.

You might not be aware that $1/12$ -scale racing is one of the oldest forms of R/C. Imagine having to control a speeding object that's no bigger than a shoe box around a tight, narrow roadcourse for 8 minutes—that's right, 8 minutes!—with as many as seven other cars on the track at the same time. It may be that its challenge to our driving skills has caused $1/12$ scale's popularity plunge.

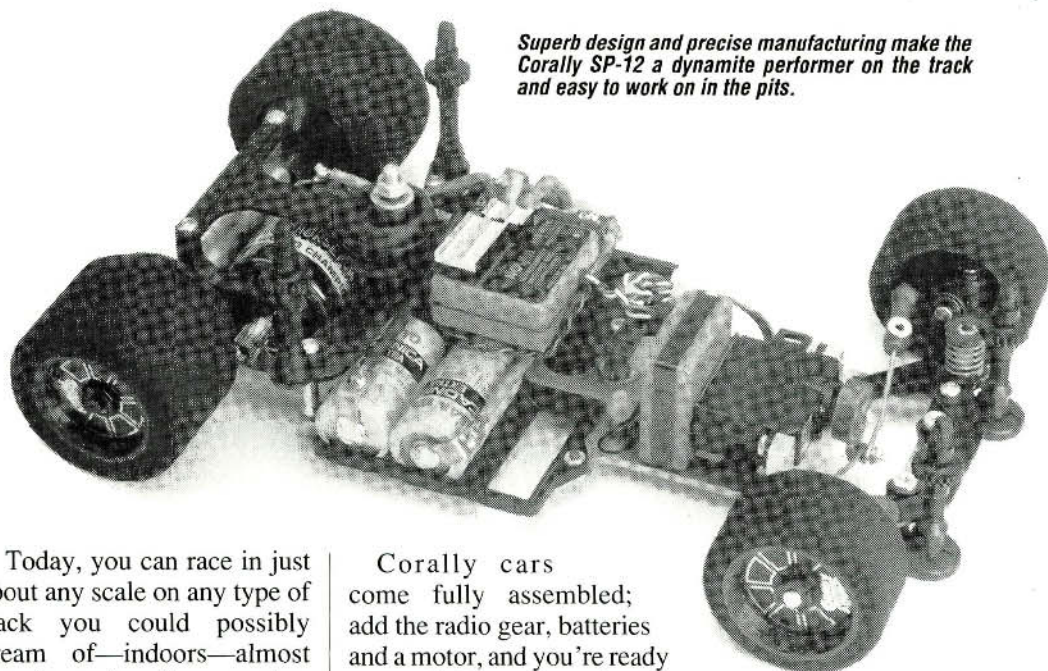
In the old days (1985!), you ran off-road outdoors until the snow started to fall, and then you either raced $1/12$ -scale cars on an indoor carpet track, or you didn't race at all!

12
-
P
S

Life in the FAST LANE!

SP-12

Superb design and precise manufacturing make the Corally SP-12 a dynamite performer on the track and easy to work on in the pits.



Today, you can race in just about any scale on any type of track you could possibly dream of—indoors—almost anywhere in the country. Luckily, like $1/8$ -scale, gas road racers, enthusiasts of $1/12$ scale are a loyal, dedicated bunch, and as long as there are Ni-Cds, there will always be a $1/12$ -scale race going on somewhere.

Unlike $1/10$ -scale on-road and oval cars, $1/12$ -scale car designs seem to last longer before they become obsolete, and a prime example of this is the Corally* SP-12. Made in Holland, the SP-12 has been on the race scene for about three

Corally cars come fully assembled; add the radio gear, batteries and a motor, and you're ready to race. I planned to update this particular SP-12 with some of the latest Corally hop-up parts, so it might as well have come in kit form! As I disassembled the SP-12, it became apparent that much thought was behind its engineering. The entire chassis is held together with retaining clips and Torx screws, so you basically need only one tool to work on this car.

CORALLY CHARACTERISTICS

The SP-12's basic design isn't new or incredibly innovative (you won't find any load actuators or full floating rear pods), but the particular combination of chassis components and the manner in which they're used make for one of the best-handling $1/12$ -scale cars in the world.

You first notice that its chassis is neither graphite nor fiberglass but a light, hardened alloy known as "Coral." According to Corally, Coral is superior to the materials typically used for R/C car chassis in that it flexes the same amount in all directions, and this makes a race car that handles more consistently.

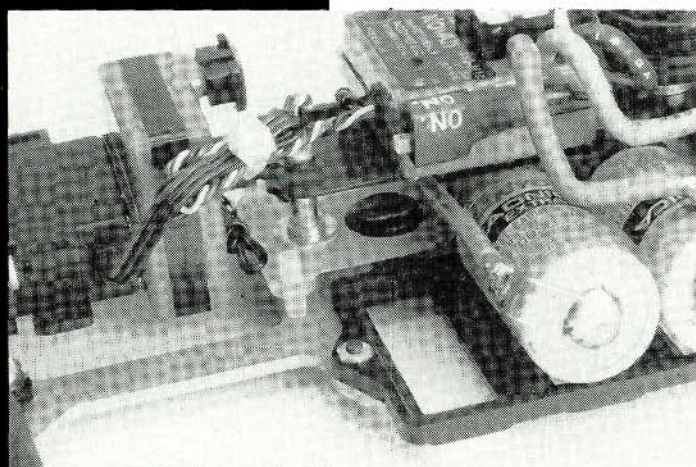
(Graphite and fiberglass always flex more in one direction than in another.)

FRONT SUSPENSION

Traditionally, the SP-12 used independent, triangular A-arms up front, but the latest version uses a one-piece, aluminum, "beam" front suspension. This beam is basically the same as the original A-arms, but the two "arms" are joined by an integral center section that acts like a sway bar to limit chassis roll and increase stability at high speeds.

Unlike many other on-road cars, instead of having the front-suspension coil springs on the steering kingpins, the SP-12 has large-diameter coil springs mounted inboard on the suspension arms—a design that separates suspension action from steering movement. Rounding out the Corally's front end is a center-point steering system that prevents tire scrub when the car is cornering fast.

Its battery holders are unique to the Corally. As with other $1/12$ -scale cars, the batteries are mounted in a saddle-pack arrangement with up to



The SP-12's T-plate rear suspension was modified. The stock plate offers no provision for "tweak" adjustment, so Corally offers a bolt-on fiberglass adjustment plate, and this allows the SP-12 to recover more quickly from fast turns.

years, during which time it has slowly been refined, but its original design remains untouched. This review deals with the latest SP-12.

three cells on each side. Instead of the usual battery slots, however, the Corally has removable battery trays to which the cells are simply glued. When you want to change packs, unbolt the trays and remove them.

POD CREATURES

Attached to the Coral chassis is a T-plate-type rear-suspension pod that resembles those found on most on-road cars. What makes the SP-12's pod unique is that there's no provision for "tweak adjustment." A car that's "tweaked" has unequally loaded wheels, and it will favor either left or right turns. The Corally's T-plate pivots freely on two metal

a pair of striking red-anodized aluminum axle carriers; one just supports the axle tube, and the other also acts as a motor mount. The axle itself is held on the pod by an oval-shaped aluminum tube, the ends of which contain plastic holders for the ball bearings the axle rides in. Rear ride height can be adjusted by choosing from among three different bearing holders that allow a total of six possible settings. The damping T-plate is mounted on the tops of these axle carriers. Like those on most other on-road cars, it's of the friction-plate variety, but there's a difference: the SP-12's damping washers, the springs and the ends of the plate itself, are all

piece connects the two arms to make a setup that's much like the beam front end that comes on the car. Now, simply by adding or removing the carbon-fiber cross-piece, you can choose between a semi-flexible beam (which slightly diminishes low-speed to moderate-speed steering response), and independent front arms (which increase off-power steering).

• **Rear T-plate.** As mentioned earlier, the SP-12's unique, self-centering T-plate allows the SP-12 to attain a neutral tweak setting automatically. This has one disadvantage: the car takes a little longer to recover from chassis roll when making tight S-turns. To remedy this, Corally has produced a fiberglass tweak plate that can be bolted directly onto the Coral T-plate and allows you to adjust tweak by means of two nylon set-screws that are threaded through the plate.

CORALLY COUNT CONTINUES!

A properly functioning differential can markedly enhance cornering ability. More than any of its other features, the SP-12's diff is a radical departure from the norm.

For starters, it's fairly easy to adjust: simply take the retaining clip off the right rear tire (with your fingers, of course), and turn the knurled adjusting nut. For incredibly smooth differential action, the SP-12's thrust bearing uses balls of the same size as those found in the diff gear itself, and its ball race also has the same diameter. This makes the Corally diff one of the smoothest, if not *the* smoothest, on the market. A nice fea-

**Overall, the
SP-12 is
one smooth
performer
that
makes driving
seem
effortless**

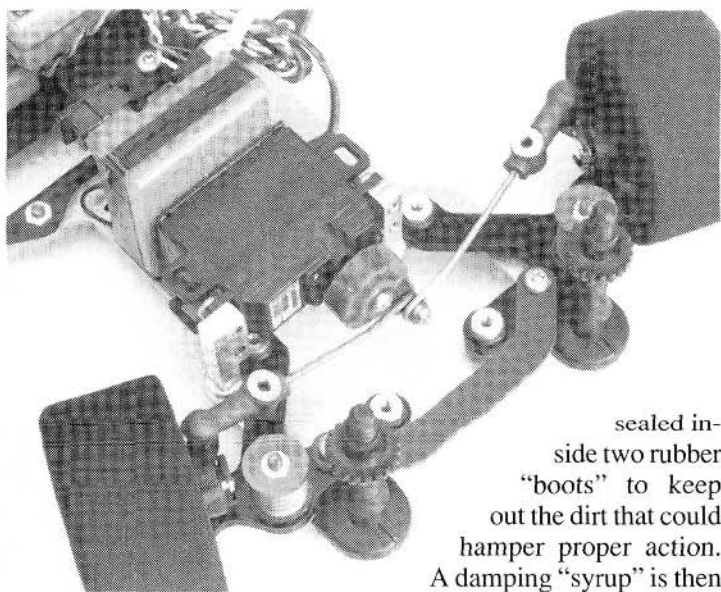
ture here is that the wheel on the diff side is also supported on its outside by a ball bearing that makes it ride as true as possible.

RUNNING GEAR

With the chassis complete, it was time to choose from among the myriad radios, speed controllers, servos, receivers, motors and batteries that are available for serious racing applications.

I chose the Airtronics* Caliber 3P radio, which has all the features needed for a car of the Corally's quality. For a speed controller, I picked the Novak* 410M1c because of its smallness, smooth power curve and regenerative capabilities (a must for 8-minute $1/12$ -scale racing). For a steering servo, my choice was one of the new Airtronics, high-speed miniservos—the 94143. I replaced the stock Airtronics receiver with the Novak NER-3FM, which is considerably lighter.

Next in importance to chassis setup and driving is the right choice of batteries and motors—critical to the success of a $1/12$ -scale outing. For 8 minute modified racing, 1700 SCE batteries are used exclusively. For the SP-12, I decided on a set of PT* matched



The stock SP-12's "beam" front suspension was replaced by an independent A-arm arrangement (also by Corally). Steering is handled by Airtronics' new 94143 high-speed miniservo through a center-point steering system.

balls that are secured to the chassis, so load is automatically distributed equally to all four tires.

Mounted to the T-plate are

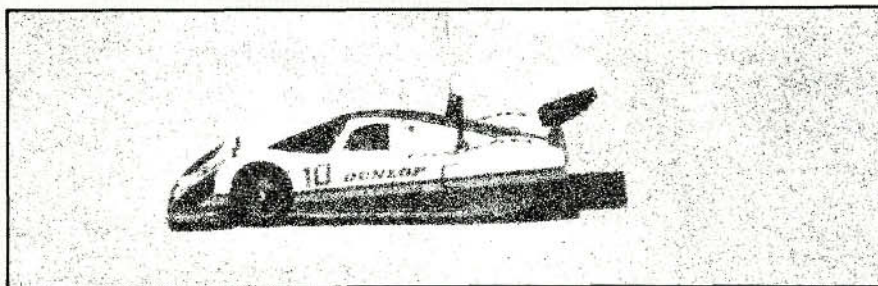
sealed inside two rubber "boots" to keep out the dirt that could hamper proper action. A damping "syrup" is then applied to the plate to act as a "friction medium" and slow the action of the damper.

FACTORY MODS

• **Front suspension**—the first factory modification was the front suspension. Corally makes a set of aluminum A-arms that are similar to the ones used on the original SP-2, but a carbon-fiber cross-

CORALLY SP-12

SPECIFICATIONS



Type On-road racer
 Scale 1/12
 Price \$275

DIMENSIONS:

Overall Length 10.25 inches
 Width 6.5 inches
 Wheelbase 7.875 inches
 Front Track 6.375 inches
 Rear Track 6.5 inches

WEIGHT:

Gross (with battery) 30.5 ounces

BODY:

Type Not included

CHASSIS:

Type Plate
 Material Alloy

DRIVE TRAIN:

Primary Pinion/spur
 Transmission Rigid axle
 Differential Ball
 Bearings/Bushings Ball bearings

SUSPENSION:

Front: Type Aluminum beam
 Damping Coil springs
 Rear: Type T-plate pod
 Damping Friction damper plate

WHEELS:

Front: Type One piece

Dimensions (DxW) .. 1.125x1.0 inches
 Rear: Type One piece
 Dimensions (DxW) 1.125x
 1.375 inches

TIRES:

Front/Rear Corally green dot

ELECTRICS:

Motor, Battery,
 Speed Controller Not included

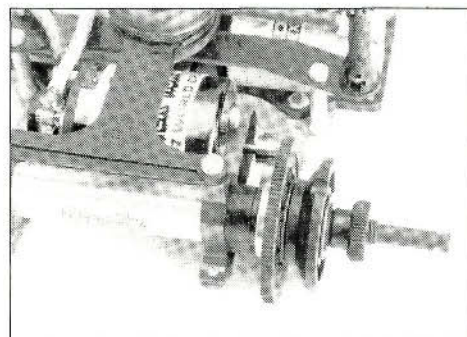
OPTIONS AS TESTED:

Airtronics Caliber 3P; Novak NER-3FM receiver; Novak 410M1c ESC; Airtronics 94143 miniservo; PT matched 4-cell battery, Du-Mor R/C Pro-Thin spur-and-pinion gear; Corally tweak-adjustment plate and independent A-arm front suspension; Trinity Torkzilla motor; Andy's painted Nissan GTP body and wing.

COMMENTS:

The SP-12 is a state-of-the-art 1/12-scale race car. The quality of its components is exceptional. Maintenance is simplified by the use of retaining clips and Torx screws throughout. The SP-12 comes fully assembled, just waiting for the radio gear. I'd prefer to construct the car myself from a kit, but its simple, logical design and great instructions make tear-down and reassembly easy.

* not included



With the rear wheel removed, the SP-12's differential can easily be adjusted by means of a nut that can be turned manually. A Du-Mor R/C Pro-Thin spur gear and pinion are used for smooth running and precise gear mesh.

the car. Then slowly add traction additive to the fronts as needed.)

The first few laps showed that the SP-12's four green-compound tires worked best when traction additive was applied to the entire surface of the rear tires and the inside half of the front tires. This combination allowed the car to turn sharply yet kept oversteer to a minimum.

Overall, the SP-12 is one smooth performer that makes driving seem effortless. Though I had never driven it before, the Corally behaved like an old friend after just a few slow laps. It had ample ability to turn, and it tracked nice and straight—just the way I like it. Recovery from sequential left and right turns was brisk and controllable.

My impression of the Corally SP-12 is that this is a piece of high-quality work. All the parts fit precisely, and it takes little effort to maintain the car. The use of Torx screws throughout is a nice touch that eliminates the need for the assortment of tools you usually have to have ready to work on an R/C car. If you're interested in getting into 1/12 scale, the Corally SP-12 is definitely worth a close look.

**Here are the addresses of the companies mentioned in this article:*

Corally; distributed by Du-Mor R/C Inc., 1002 Union Landing Rd., Cinnaminson, NJ 08077.

Airtronics Inc., 11 Autry, Irvine, CA 92718.

Novak Electronics Inc., 128-C E. Dyer Rd., Santa Ana, CA 92707.

PT Batteries, 20-25 23rd St., Astoria, NY 11105.

Trinity Products Inc., 1901 E. Linden Ave., Linden, NJ 07036.

Andy's R/C Products, 1710 Gravelia Ct., Ontario, CA 91761. ■

batteries, and I wired them to a Trinity* Torkzilla 13-turn single motor.

I usually run my 1/12-scale cars with one of the TOJ Can-Am bodies, but I've heard that ROAR has outlawed them because they're dated (Can-Am racing is long dead). As luck would have it, there just happened to be an Andy's* Nissan GTP body kicking around the *R/C Car Action* office, but this was no ordinary body—oh, no; this *particular* Nissan was painted by none other than Andy Jacobson (the "Andy" of Andy's fame), and it's a killer!

READY TO ROLL

Unfortunately, my local club's 1/12-scale track is in its off-season, but although the boards had been taken up, the Ozite (the type of carpeting that's typically used for indoor racing) was still intact. With a little effort and a few leftover boards, I was able to map out a simple roadcourse.

With the batteries peaked and the rear tires coated with traction additive we were ready to roll. (A good rule of thumb, especially with a new car, is to start with traction additive only on the rear tires, and then to run a few laps to get a "feel" for

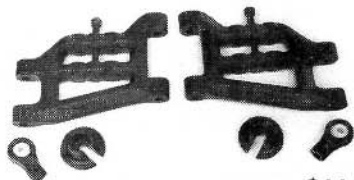
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THE 7TH ANNUAL
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7044 RC-10 Front Arms Kit (team car)

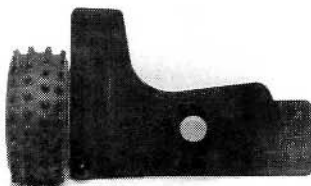
Lightweight and extra stiff. The same length and geometry as the Team Car and kit comes with everything shown.



\$11.95

7099 Precision Camber Gauge

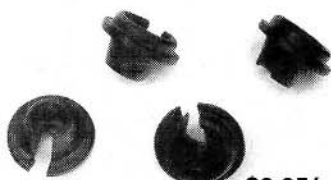
No more guessing, now you can check, or set the camber easy and accurately on any car or truck.



\$9.95

7025 RC-10 Spring Cups (4)

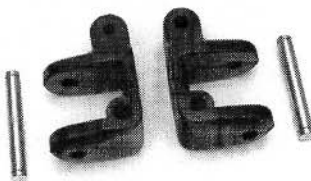
Lightweight and easy to install. Has the proper shoulder to retain the spring, and lifts it off the arm 1/4 inch higher.



\$2.95/set (4)

7385 Losi Heavy Duty Front Carriers

Molded and designed nylon tough. King-pin bearing surface is increased for added front-end strength and durability.



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7009 RC-10 Front and Rear Spindle Set 7005 Inline Fronts 7007 Heavy Duty Rears

Beefed up for less flex and tighter fits. Designed and molded nylon tough.



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\$8.95/set (4)

7301 JRX2 .050 Toe-in Rear Links

7306 JRXT .050 Toe-in Wide Rear Links
Replace the forward links with these and you will get 2" added toe-in to the Losi 5 link or R.P.M. Extra Wides.



\$4.95/pair

Distributors: A.K.S. Dist., Arlington Heights, Eagle Dist., Global Dist., Great Planes, H.R.P. Dist., Horizon, Pan American, R/C Specialty, R/C Dist., R/C Henry, Speed & Sport, T.M.S. Dist.
Overseas Distributors: G 7 M Trading - Australia, Keil - West Germany, Speed Connection - Ontario, Canada, Speedy Cars - France, Thor Racing - U.K.
Send \$2.00 for catalog and decals - 14978 Sierra Bonita Ln., Chino, CA 91710

WORLD CHAMPS

(Continued from page 51)

were more important than the Mains to the drivers, who will be returning in August. I'm not implying that the racing wasn't good or that the winners didn't have to earn their victories; the opposite is true. In the middle of the pack, however, there seemed to be less concern with "saving face" or trying to come from behind in heroic fashion. Maybe this is how you have fun before the real battle; maybe this is "race-car poker"—no one shows his hand. Either way, the weekend was fun and a good learning opportunity for all.

One final note of interest: Jurgen Lautenbach, the winner of the 2WD Modified, was seen testing his car at the Freedom Hill track on the Wednesday after the race. Did someone say practice makes perfect? ■

PIRATE M1

(Continued from page 65)

factory. If you feel the need, however, OFNA also sells a hard-anodized aluminum chassis. While the performance advantage is nil, if any, the hard-anodized chassis resists abrasion and looks better longer. A graphite chassis and radio plate are also available from OFNA. For a little extra protection, I coated the bottom of the chassis with Litespeed's* Tuff-Stuff. It works well, but fuel eventually causes it to peel off.

NATTY TREAD

The kit's rims are made of white nylon and they have a diagonal spoke pattern, but OFNA also offers a set with a straight five-spoke pattern. They're similar to the rims used on the Turbo Burns, but can only be used on the Pirate. The tires that

(Continued on page 110)

***** A.J.'s R/C *****

★ M/C ★ New MRC Bruiser Parts Available ★ VISA ★

★ Funny Cars ★ That Run FFFFFFFFFAST!! ★ NEW Top Fuel F/C Record ★

Guaranteed Graphite Chassis
Polished Aluminum Mag Wheels
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Contender 1/10 Funny Car Kit \$169.95
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New: AJ's 6 Tooth Steel Pinion Gear 13.95 ea.
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A.J.'s Scorchers Black Magic Motors:

AJ's Scorchers Mod. Clod, USA-1 Hi-Speed pair 52,000 rpm 99.95
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★ Aluminum Wheels, Bearings, ★
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PHOTOS BY YAMIL SUEO

by CHRIS CHIANELLI

HAVE YOU EVER wanted to build something different without getting into a lot of modifications? If so, read on, because except for its rear hopper and the Imex* single front tires, Project Bull-Dozer-

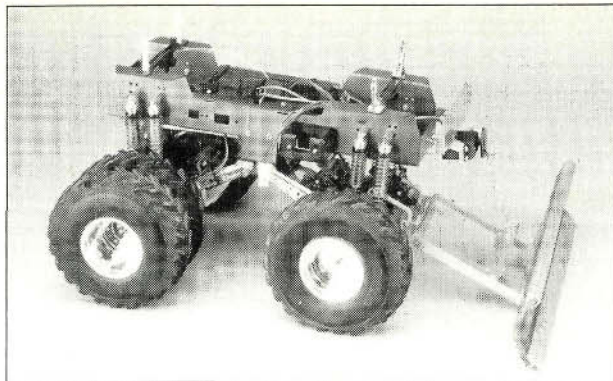
Head is an entirely bolt-together affair. It's so simple that if an average builder was left alone in a room with this kit, he would emerge with his own Dozer-Head in about two hours.

(Continued on page 103)

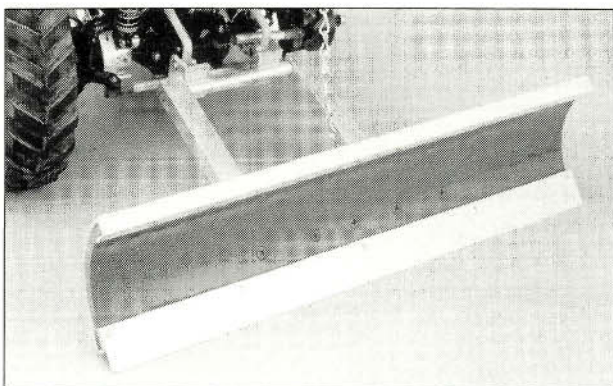
P R O J E C T
BULLDOZERHEAD



P R O J E C T BULLDOZERHEAD



With Trinity Clod Buster shocks and the greatly improved suspension travel, the dual-purpose Dozer-Head can become a 4WD off-roading monster with the plow removed.



The Dozer-Head's plow comes assembled from ESP and bolts directly to the front guard bars.

Basically, the main-drive/suspension assemblies, the battery cups, the mounting posts with braces and the radio tray are from the stock Tamiya* Bull (or Clod). These parts, and the ESP* plow, are bolted to a Sassy Chassis* Clod Buster aluminum frame. Sassy Chassis has simplified the conversion by accurately drilling all the holes for you. Of course, you could use the stock plastic chassis, but then it wouldn't be a true Bull-Dozer-Head, would it? Besides, the Sassy Chassis' advantages are considerable. Not only is the red-anodized aluminum frame stronger than the stock ABS plastic frame, but it also increases suspension travel—and of course, let's not forget how much cooler it looks!

The drive/suspension assemblies were mated to the chassis using Trinity's* gold-anodized Clod Buster

add the battery holders, Zap* some spacers to the inside of the chassis. Remember that the plastic chassis is thicker than the aluminum one, so the spacers prevent the removable holder from flopping around. Make the spacers out of scrap balsa or plastic that's about 1/16 inch thick. The final stock parts to be fitted are the radio plate, which you can bolt right on, and the mounting posts with braces, if you use Clod mounts, the stock posts screw

shocks, which work smoothly and improve the truck's appearance. ESP's cross-braces, which span the plastic ladder and serve as reinforcements, were also added to the suspension. Next, the steering servo and plastic mounting plate were bolted into the bottom of the chassis; once again, Sassy Chassis has greatly simplified construction by pre-drilling the necessary holes.

In keeping with the Dozer-Head's heavy-duty looks, I used ESP's HD steering rods which look great, are nearly indestructible, and—most important—are cut to length! When you

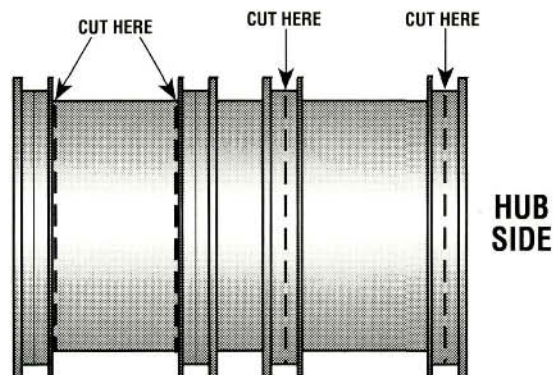
right on; if you use Bull mounts, you'll have to drill the locator-pin sites. In the rear, I had to use longer TRC* mounts to hold down the body and the hopper.

Like most of this project's components, the ESP plow can be bolted right up to the front diff-case guard bars without modification. Because the unit was designed for the Clod chassis, I had to bend the plow's servo mount slightly (about 20 degrees) to align the lifting chain and the servo disk. Be sure you use a servo that's designated "heavy duty"—not a normal servo—to lift the plow blade. The best one for this project is probably an airplane retract servo.

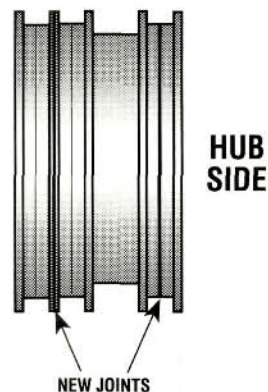
You'll need a radio with three channels. I use an Aristo-Craft* 3XP, which is no longer available; many companies, however, offer radios on surface frequencies that have more than two channels. ESP's conversion kit allows you to operate the plow with only two channels by coupling the servo to the throttle with a Y-harness. To complete the Dozer-Head's serious look, I added an ESP aluminum bumper to the rear, and an APM* bumper in front.

DOZER-HEAD PARTS LIST

PDI Turbo Zeta speed controller	1041	\$299.95
Sassy Chassis Clod Buster chassis	9900	\$99.95
ESP Blizzard-Buster snow plow	015	\$69.95
ESP twin tube lower bumper	003	\$14.95
ESP suspension stabilizers (2)	002	\$8.95/pair
ESP heavy-duty steering rod kit	029	\$19.95
Trinity Matched Madness modifieds	2030	\$99.99
Imex Dual tires and rims	8660	\$49.98



To make single-wheel fronts out of the Imex duals, cut the rims on the dotted lines, discard the center sections and rejoin as shown with Pacer's Plasti-Zap.



P R O J E C T BULLDOZERHEAD

POWERING A BULLY

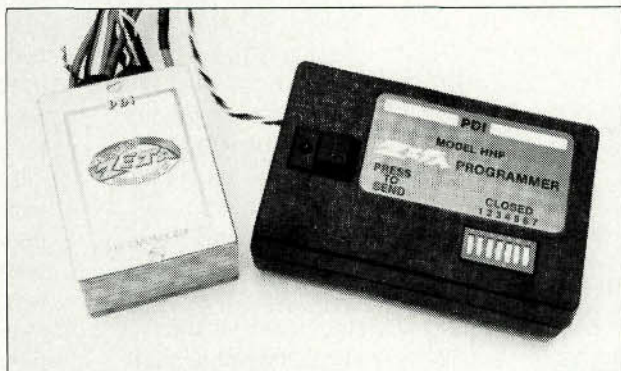
Since the electronics shouldn't play second fiddle to the macho rolling chassis of Mr. Dozer-Head, I installed a set of Trinity Matched Madness Modifieds and a PDI* Turbo Zeta electronic speed controller. We've received many letters asking, "I need an electronic speed controller with reverse that can handle two modified motors. My hobby shop says there isn't one; why doesn't somebody make one?" PDI does! I've used PDI controllers for a long time, and I've never seen one fail. The Turbo Zeta has dominated the pulling scene for years, and I think that it's the one to use. It's set up so that all Mosfets are used in both forward and reverse modes. Forward or reverse is selected by an electronic switching device by first pushing the trigger forward to "shift gears," and then pulling the trigger back for throttle (whether you're in forward or reverse).

I chose Imex Clod Buster dual tires and rims, and I modified the front rims to accept the single tire—an experiment of dubious value! (More on that later.) The standard dual Imex tires looked good and provided lots of traction on a variety of surfaces, including mud; I highly recommend them.

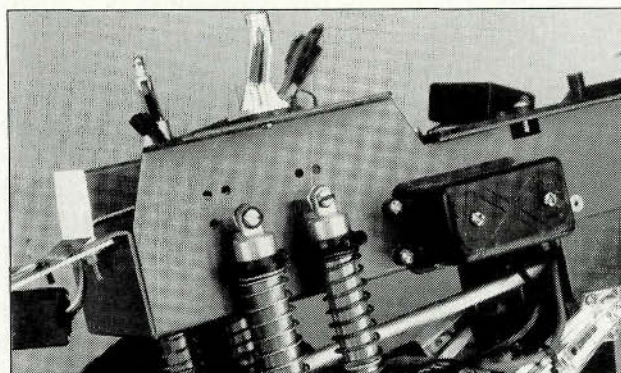
The homemade (from balsa and sheet polystyrene) sand/salt hopper was an experiment that worked out well. It's reminiscent of New York road service vehicles, seen doing their thing at 4 a.m. right after a snowstorm. (You can take the boy out of the city, but you can't take the city out of the boy.) If you like the hopper, let us know, and we'll show you how to make your own. If you hate it, save the postage stamp.

THE WEAK-KNEED MONSTER

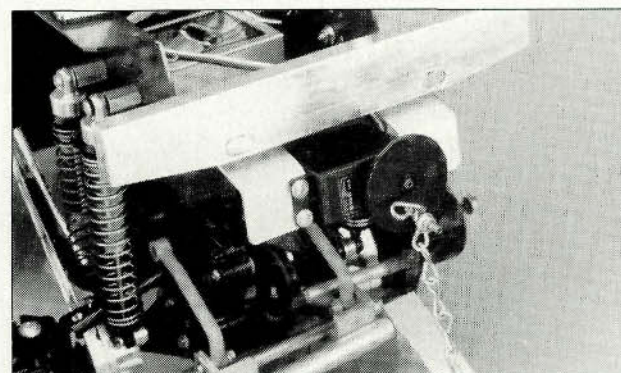
As it turns out, not all of my experiments worked as well as the hopper did. To be honest, my modified single Imexes are lousy, and I don't recommend them. Their side walls are too soft to be used singly, and the single rims,



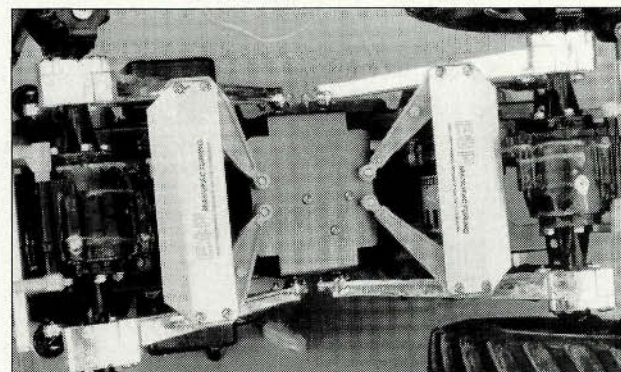
When you use a hot motor, a speed controller like the PDI Turbo Zeta keeps everything under control. Although the Zeta is rather large, the Dozer-Head's chassis has plenty of room for it.



If you use the Sassy Chassis, you won't need a lift kit. The chassis has mounting holes for shocks of various lengths.



A servo that raises and lowers the plow is mounted to the front of the Dozer.



A set of ESP braces was added to the bottom of the stock Dozer. The braces help stiffen the ladder bars and protect the motor.

which had to be cut and glued in three places, were a little fragile. If you still like the way they look and want to make your own, you'll have to put foam inside the tire for support. Be sure to use a good CA that's designed especially for plastics (like Pacer's* Poly Zap).

The Dozer-Head's suspension is reinforced by the ESP aluminum stabilizers, which also greatly enhanced handling and steering. The combination of the Sassy Chassis and Trinity's aluminum Clod Buster shocks vastly increases travel, smoothing out the gullies and bumps, especially when you're going fast—something you should do *only* with the plow up! The plow isn't strictly a showpiece, but don't expect it to do major excavating. For realistic plowing, conditions have to be just right—a smooth surface with traction, and a granular substance like sand to push. The unit, which comes assembled, is made out of aluminum and PVC pipe, and it's quite strong.

If you want to make a lot of money plowing racetracks in the winter, don't bother building your own Bull-Dozer-Head. But, if you're looking for something different that can be bolted together; is good for a lot of laughs; and can have its plow blade removed for normal monster-truck competitions, then there's room in your life to do a Doze.

**Here are the addresses of the companies mentioned in this article:*

Imex Model Co. Inc., 2201 E 5th Ave., Ronkonkoma, NY 11779.

MRC/Tamiya, 200 Carter Dr., Edison, NJ 08817.

ESP Mfg., 20 Crystal Lake Plaza, Crystal Lake, IL 60014.

Sassy Chassis, 906 Ridgewood Dr., Cary, IL 60013.

Trinity Products Inc., 1901 E. Linden Ave., Linden, NJ 07036.

Zap; distributed by Frank Tiano Enterprises, 15300 Estancia Ln., W. Palm Beach, FL 33414.

TRC, P.O. Box 1058, Albemarle, NC 28001.

APM Custom Hobby Inc., 810 31st St., Union City, NJ 07087.

Aristo-Craft/Polk's, 346 Bergen Ave., Jersey City, NJ 07304.

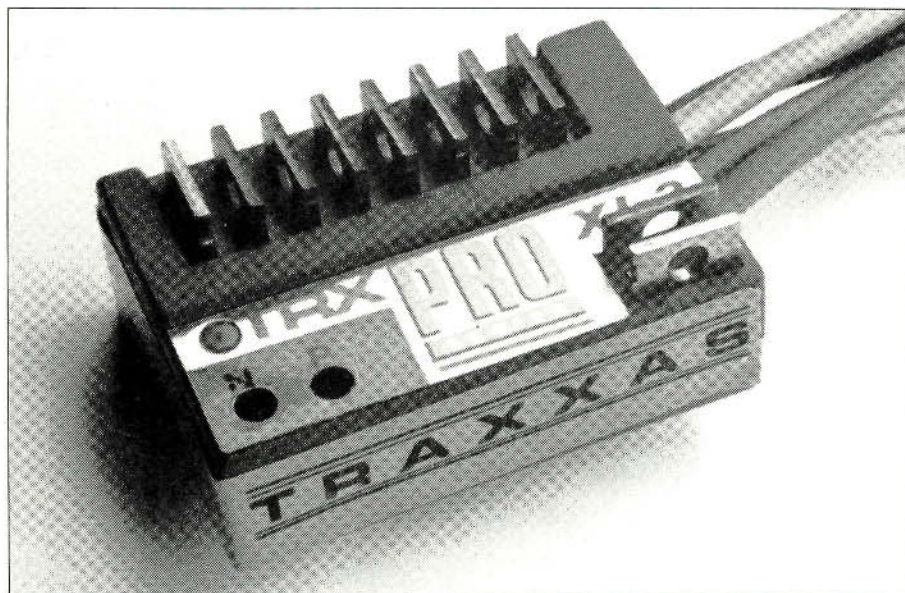
PDI, 16922 N.E. 124th St., Redmond, WA 98052.

Pacer Technology and Research, 9420 Santa Anita Ave., Rancho Cucamonga, CA 91730.

SCOPING OUT

by JOHN RIST

Traxxas XL-3



EVEN AT FIRST glance, it's clear that Traxxas* has jumped into the racing world with an all-out racing speed controller (SC)—the XL-3. A look inside revealed 10 FETs (eight to handle the forward current, and two for braking) and monster-wire motor leads and battery leads. There are no connectors for the motor or the battery, and that's another indication that this SC is meant for racing. (The instructions say that Traxxas recommends the use of high-quality connectors like those made by Sermos*.) The Traxxas XL-3 racing-style SC has these features:

- forward-only with brakes
- eight FETs for forward and two for brake
- built-in pulse-checker
- built-in BEC
- neutral and full-speed potentiometers
- on/off switch
- heat sinks, motor capacitors and tie-wraps.

All this was enough to drive me into the "Scoping Out" lab to see whether the numbers for the Traxxas XL-3 would match its appearance.

I always look inside an SC, and the Traxxas is very easy to open. Just take the sealing tape off and pull the case apart. My look inside revealed a well-made, good-looking controller. The FETs have very heavy solder bridging across their leads to help carry the current, and the components are quite tightly packed. Using conventional components, Traxxas seems to have made this controller as neat and as small as possible. But looks don't feed the bulldog, so I was ready to see whether the Traxxas XL-3 could pass my tests.

VOLTAGE-DROP TESTS

My first test is always the resistance test. It's very difficult to measure the resistance of an active electronic device, so I measure the voltage drop across the controller while I pass 12 amps of current through it. I then calculate the resistance by using the formula: voltage divided by current equals resistance.

I take the voltage reading at two points: first, along the full length of the motor and battery wires; second, 2 inches along those wires. The first reading shows the

resistance of the stock controller; the second is the standard reading with which I compare controllers.

Pumping 12 amps through the XL-3, the measured voltage drop along the length of the wires was .10 volt (a resistance of .008 ohm). At the 2-inch point, the voltage drop was .05 volt (a resistance of .004 ohm). Given this SC's eight forward FETs, I expected somewhat lower numbers, but these are good and should mean hot performance at the racetrack.

LET-IT-COOK TEST

For this test, I increase the current to 20 amps and let the controller cook for 15 minutes. I installed the supplied heat sink to make sure that the heat-sensing

• THE SCOPING OUT LAB •

John Rist's lab consists of:

- an oscilloscope
- a digital voltmeter
- a resistor load bank
- a 6V 30A electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on.

The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5W power resistors, which can be switched on and off one at a time to vary the load between .6 amp and 20 amps, but the standard 12 amps are usually used.

In series with the resistors is a 25A Simpson current meter and a 1-percent .01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

FET (quite often, only one of the FETs will be a thermal sensor) would sense the heat built-up, but I didn't provide any cooling air. After 15 minutes, the controller was quite warm, but not hot enough to be in danger of thermal shutdown.

DEAD-SHORT TEST

For this test, I put an ugly piece of monster wire right across the motor leads (attached by alligator clips). I then slam the throttle to max and wait to see whether the controller will destroy itself, or whether it's tough enough to survive.

With the short in place, the current jumped to 40 amps (the limit of my power supply), and things really started to heat up. At approximately 58 seconds into the test, the controller stopped pumping current, looked dead and was smoking hot. Had the thermal shutdown worked? To find out, I removed the short, waited for about 2 minutes, then reapplied power. The Traxxas XL-3 sprang back to life!

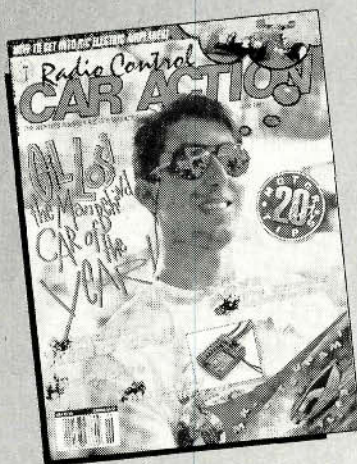
It seemed a little unreasonable that the Traxxas XL-3, with its eight forward FETs, would heat up enough to kick it into thermal shutdown with a 40A load, so I called Mike Jenkins at Traxxas to discuss the problem. He told me that their engineering department had dumped the total charge from an SCR battery pack through the controller without it going into shutdown. He claimed that their peak current had jumped to 100 amps at the start of the test, and that they ran the Traxxas XL-3 for more than a minute without seeing thermal shutdown. He suggested that I probably didn't have the controller at full throttle. It's also possible that the SC's BEC had dropped below a safe limit because, under dead-short conditions, the voltage from the supply had fallen too low.

(Continued on page 108)

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SCOPING OUT

(Continued from page 107)

With this information, I headed back to the lab to see whether I could duplicate the Traxxas test. With a fully charged, 6-cell SCR pack in place and the dead short applied, I jammed the pedal to the metal. The current did, indeed, jump to 105 amps. Over 1 minute, 15 seconds, it fell to around 10 amps. The shorting wire was smoking, the battery pack's covering burnt off, and the Traxxas XL-3 became quite warm, but it never went into thermal shutdown. I'm convinced that this controller can take a lot of abuse and keep on trucking. As always, with this kind of horsepower available from your battery and controller, if you have a jammed gear and you don't let up on the throttle, goodbye motor!

INSTALLATION INSIGHTS

Having completed the lab tests, it was time to have some fun. After all, this lab work is just that—work—and with a racing SC, fun is a good hot run. I set out to install the Traxxas XL-3 in my Associated* RC10L pan car. I dug out the XL-3's instruction sheet and gave it the once-over to see whether it had any words of wisdom about installation. It does provide enough information to help you get the job done, but there aren't any drawings or pictures to show how everything should be connected. If this is your first racing-style SC, it might be wise to ask someone to help you install it.

As a racing SC, the XL-3 doesn't come with motor or battery connectors. The instructions recommend that you use high-quality connectors for the battery and that you hard-wire the motor. This is my favorite method, so I followed the instructions.

When I had the controller open, I noticed that the blue motor wire, which was attached to one end of the controller's printed circuit board, ran along its length, and exited the case at the opposite end, near the other wires. I thought I'd be able to cut a small hole at the blue wire's end of the case so that it could exit right there. Then, by removing one of the red wires, I could turn the XL-3 into a competition-style three-wire controller with very short wires.

I tried this, and I found that the case was very easy to cut with a standard hobby knife. When I had finished, I had

TRAXXAS XL-3

DIMENSIONS:

Height (with heat sink) 0.75 inch
Width 1.25 inches
Length 1.875 inches
Weight (with wires) 2.1 ounces

TUNING:

Access to controls Excellent
Ease of adjustment Fair

PRICE:

Sug. retail price \$175
Warranty 30 days

ELECTRICAL:

(Manufacturer's specs)

Max no. of cells 7
Min no. of cells 4
Max current forward 1788 amps

Continuous-

current forward 447 amps
Resistance* 0.0018 ohm

TEST PARAMETERS:

Voltage 6 volts
Current 12 amps

TEST RESULTS:

Voltage drop
to end of wires 0.10 volt
Voltage drop
at 2-inch point 0.05 volt
BEC output,
6-cell battery 5.30 volts
Resistance to
end of wires† 0.0083 ohm
Resistance at
2-inch point† 0.0041 ohm

*measured from the board

†Resistance=Voltage Drop/Amps

COMMENTS:

The XL-3 is Traxxas's leap into the racing-style ESC market. It's a no-frills, eight-FET-forward, two-FET-brake speed controller. Traxxas intended this ESC to have enough staying power to hold up under heavy use in a racing truck, such as its Blue Eagle. The XL-3 survived the "Scoping Out" lab's dead-short test, as well as an inadvertent short when the motor wires were soldered to opposite ends of the same brush hood—proof that it's a heavy-duty ESC. The instructions lack installation pictures, and the controller doesn't have pre-installed motor and battery connectors, so it might be wise for an inexperienced R/Cer to have help when installing the XL-3. Its suggested retail price seems a little high, but it does have 10 FETs, and shrewd shopping should turn up a reasonable price.

what looked like a very hot, short-wire setup.

MOTOR-WIRE MISTAKE

Next, I adjusted the two potentiometers to match my transmitter, but when I connected the battery pack, all I got was smoke and a faint growl. I shut it down fast and rechecked all my connections. I had soldered one of the motor wires to the wrong lug on the motor! I had connected the two motor wires to the same brush hood—instant dead short!

With the motor wires attached properly, I connected the battery and tried again. This time, the motor ran, but only when I applied brake. To cure this, I flipped the throttle-reversing switch on my transmitter. If you plan to use an electronic SC, your transmitter must have throttle reversing. Unlike mechanical SCs, which can be reversed by moving the control rod to the other side of the servo wheel, electronic SCs don't have any way to reverse trigger travel. The solution is to flip the reversing switch.

Now I was ready to set the neutral and full-speed pots. Neutral was easy to set. I centered the throttle trim on my transmitter and turned the neutral trim until the motor stopped running (pulse-checking LED turned off). The neutral trim pot was stuck at first, and it was stiff until I had worked it back and forth a few times.

Next, I pressed 80-percent throttle and adjusted the full-speed pot. Full speed is a little tricky to set on the Traxxas XL-3 because the LED comes on gradually as you approach full speed. There's no highly visible indication on the light that full power has been achieved, but by watching the light and listening for maximum rpm, I set full speed. (A few cautionary words about the adjustment pots: they'll only turn 90 degrees left and right from dead center, so be careful not to turn them too far when making adjustments, or they'll break.).

A HOT FUN RUN!

With set-up completed and a handful of SCR battery packs in hand, I headed to

the local racetrack to give the XL-3 a workout. I found that it's a hot performer; lap times and run times were good.

I run a B&R* Bullet stock motor; it's famous for its advanced timing, which causes high current draw, lots of heat and raw speed. At the end of my first run, I quickly checked the heat sink and found that it was barely above room temperature, but the battery and motor were hot. The XL-3 was handling the raw power without breaking into a sweat.

My only problem was that the steering went "squirrely" just as the battery pack started to dump. The battery had lasted for 4 minutes, 40 seconds (we gear for a 4-minute race), but the steering went hard left and stuck my car on the wall, so I had to walk across the track to retrieve it. On the last run of the day, I played with the brakes and found them very strong—enough for even the tightest roadcourses.

Mike Jenkins of Traxxas told me that the company's aim when designing the XL-3 was to develop a controller that would run well in a truck like their new, hot, Blue Eagle racer. They wanted it to be reliable, even for the speed freaks who run modified motors.

My test results seemed to verify that Traxxas has come up with a rugged, no-frills controller that has lots of FETs to handle the juice. Under normal conditions, with plenty of cooling air and its heat sink installed, it stays cool. In the lab, I forced it into thermal shutdown from which it promptly recovered without ill effects. The instructions are a little skimpy, and the neutral trim pot was a little stiff at first (with use, it worked well), but the Traxxas XL-3 checks out as a solid contender. Its suggested retail price seems a little high, but it does have 10 FETs, and shrewd shopping should turn up a price well below the suggested one.

**Here are the addresses of the companies mentioned in this article:*

Traxxas Corp., 12150 Shiloh Rd., #120, Dallas, TX 75228.

Sermos R/C Snap Connectors, Cedar Corners Stn., P.O. Box 16787, Stamford, CT 06905.

Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

B&R Motorworks, 28000 Tothill Dr., Saugus, CA 91350.

• DELUXE STAR

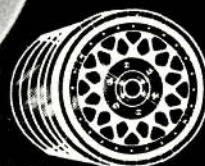
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PIRATE M1

(Continued from page 98)

come with the Pirate are well-suited to soft dirt. They have a fairly "aggressive" tread and come in both a soft and a hard compound.

The Pirate is a blast. It handles well and can survive brutal terrain. Engine performance is good, but it needs "fiddling" to run properly. After a few weeks of hard running, the piston broke. I later realized that I had leaned the engine out too much in an attempt to make it go faster, and I paid the price. I discovered that the Leo is very similar to the O.S., and an EXB piston and cylinder fit it perfectly. The Leo engine doesn't have a pin to help align the sleeve in the engine. I was able to line it up pretty well, but this shouldn't be a guessing game. Although the engine performed fairly well, I recommend the O.S. EXB or RXB for serious competition. The availability of parts for the O.S. engine also makes it easier to deal with.

I can't wait to race at the 2nd annual Kyosho/Car Action Gas World Challenge this year in Illinois, where I'll get to see how well the Pirate holds up in all-out competition!

* Here are the addresses of the companies mentioned in this article:

OFNA Racing Division, 18 Technology, Ste. 159, Irvine, CA 92718.

Loctite Corp., 4450 Cranwood Ct., Cleveland, OH 44128.

Leo; distributed by OFNA Racing Division, 771 W. 19th St., Suite K, Costa Mesa, CA 92627.

Litespeed, P.O. Box 4765, Spokane, WA 99202.

Hayes Products, 2610 Croddy Way, Unit A, Santa Ana, CA 92704.

Fox Manufacturing Co., 5305 Towson Ave., Fort Smith, AR 72901. ■

DAYS OF THUNDER

(Continued from page 71)

LIGHTNING POWER?

The choice of electronics is yours. For reliability and efficiency, I use an electronic speed controller, e.g., the Tekin* TSC 410S, a Futaba* Magnum AM radio with an S132H high-speed miniservo, and a stock-class motor. The kit's battery tray allows the use of a standard 6-cell racing pack, so there's no need to invest in saddle packs.

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The car's street-smart performance and good looks make people stop and take notice—especially if they're fans of the

movie or Grand National racing.

Generally, it handles well on smooth, flat surfaces like parking lots and drive-ways, but its track performance will fall short of most racers' expectations. This is mostly owing to the absence of a rear suspension and provisions for suspension adjustment.

Remember that the Days of Thunder cars weren't designed to compete against the many available purpose-built superspeedway cars. They could probably be modified to perform adequately on the track, but if you want to get into R/C racing, you'll probably look somewhere else. But for the beginner who wants something good-looking to bash around the neighborhood, the Parma Days of Thunder cars might be just the ticket.

* Here are the addresses of the companies mentioned in this article:

Parma International Inc., 13927 Progress Pkwy., North Royalton, OH 44133.

Du-Bro Products, 480 Bonner Rd., Wauconda, IL 60084.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

B&R Motorworks, 28000 Tothill Dr., Saugus, CA 91350. ■

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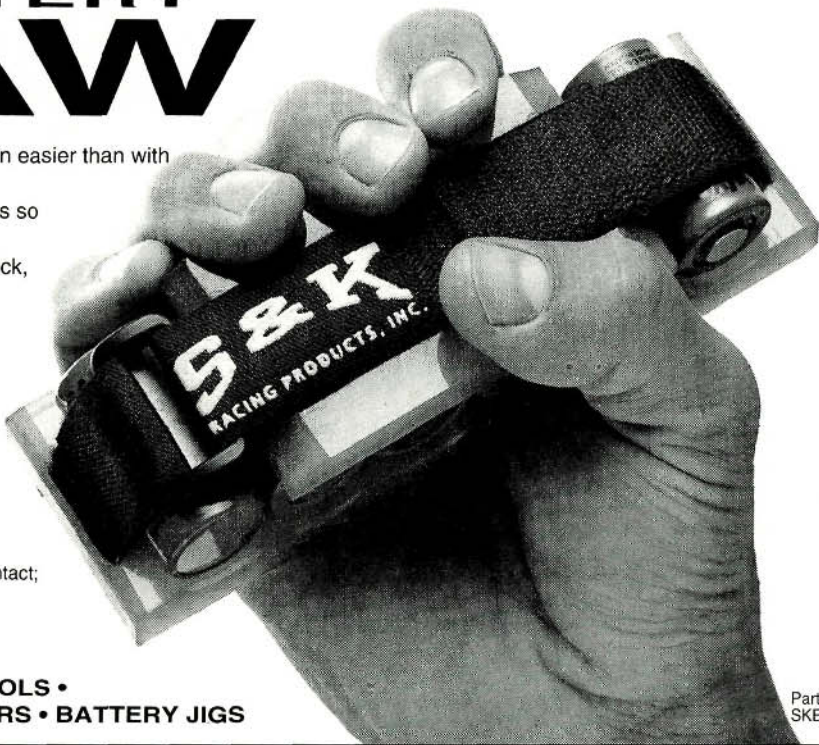
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SP-10 UPDATES

(Continued from page 84)

front end seemed to be better, but the car was really "darty" on the straights and a real handful to drive. It also bottomed-out in turns, so I had to ease the ride height (by using different axle carriers). Another commonly used method of changing ride height is to shim up the front of the T-plate, effectively altering its axle to the chassis. With the Corally, however, this isn't possible. But by getting more clearance in the rear, the fore/aft weight bias was adversely affected. This car doesn't need increased steering response! The nose-down attitude made its rear end very light, and that made the problem even worse.

I sent the car back out on the track, and this time, the wing collapsed on one of the fastest stretches. Apparently, Corally's wing mounts just aren't up to handling the forces generated by racing on high-speed ovals. Fortunately, the car wasn't up to speed, so the only damage was some scratches on the body. Another trip to the pit area revealed that nothing short of welding the wing mounts into place would really solve this problem, but we opted for the quick fix—a drop of CA.

With a fresh Max-Cell* SCE pack aboard (with a discharge time of 357 seconds at 20 amps) and a B&R* modified motor in place, it was time to air it out. Not a chance! Megatrax isn't the smoothest track on the circuit (not a complaint; just an observation!), and this setup just wasn't up to the challenge. Rather than risk damaging the car, I pulled it off to save it for another day.

That day came a week later, when I headed to my local carpet track for another attempt at the limelight. This time, outfitted with foam tires, SCRs and a Can-Am body, the SP-10 was in its element. On the smooth, flat oval of Mike's Speedway (Hadley, MA), it *dominated*. The track's current stock and modified records are held by a pair of Corallys in different (scratch-built chassis) configurations. My second qualifier put me right on the fast path to the A-Main.

CORALLY CRITICISM

My overall impression of the car is mixed. I love its engineering, fit and finish, and the easy maintenance and high manufacturing tolerances associated with Corally products are the best in the business. The oval SP-10 falls short in a number of areas, however, the most notable of which is weight. I thought the stock chassis was a little heavy, but this oval version is a lead sled! And to run anything but Corally rims and tires requires that you bolt on

(Continued on page 118)

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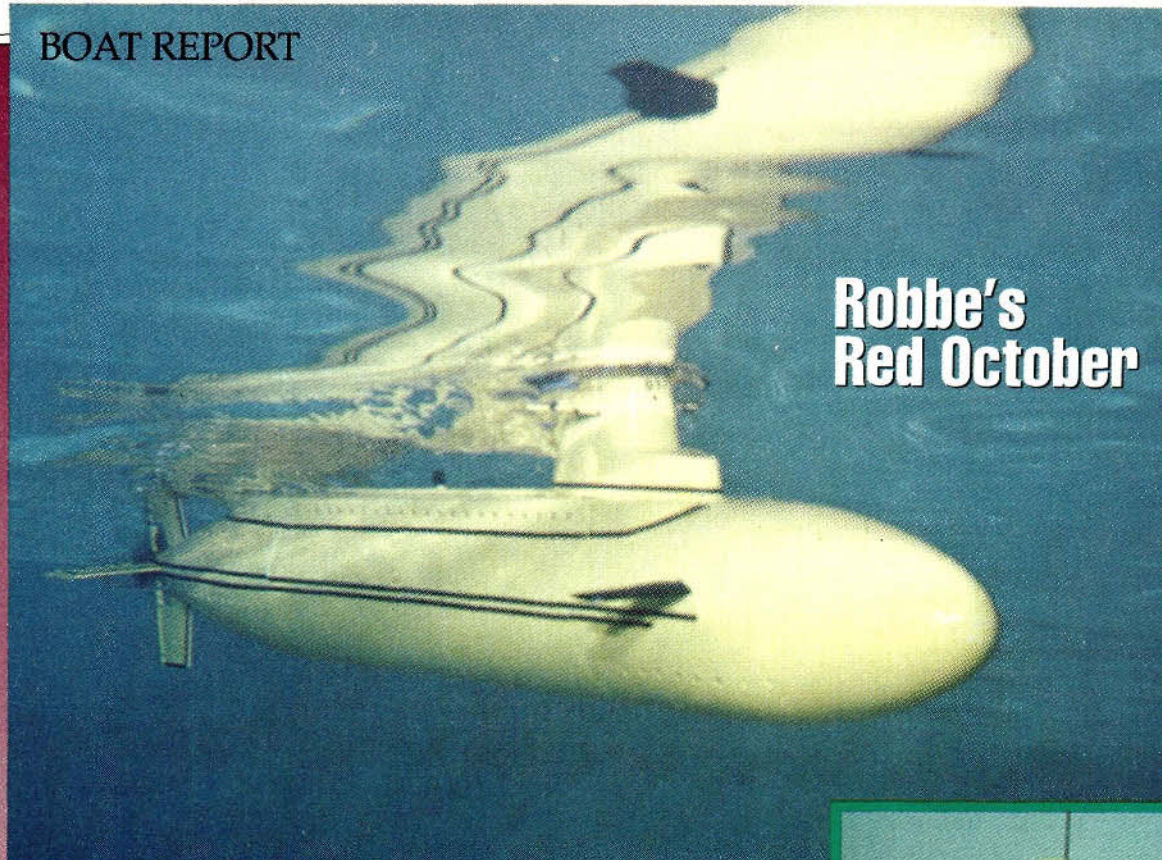
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Robbe's
Red October

ROBBE Sea-Wolf

S U B M A R I N E



PHOTOS BY RICH RUSSO & GLENN MALEK



S P E C I F I C A T I O N S

Type: Submarine
Length: 35.4 inches
Beam: 4 inches
Weight: 9 pounds
Hull Material: ready-cut plastic tube
Power Req'd: 1 EF 76II 6V to 8V motor no.4106
Radio Channels Req'd: 2 to 3 (rudder, speed controller; dive plane is optional)

Sug. Retail Price: \$189.95 (no. 1014); \$199.95 (no. 1014C, with motor and suppressor).
Features: the hull is made of a plastic tube with end caps and two free-flood hull areas at each end. The dive mechanism can be set mechanically for diving, or by radio if the modeler wants more control. The control surfaces are made of injection-molded plastic.

by RICH RUSSO

Robbe's* Sea-Wolf submarine kit was designed to give the modeler with basic building skills the opportunity to assemble a working R/C submarine. The Sea-Wolf is not a highly detailed scale model; it's a kit for beginners who have some basic tools and a little patience.

THE KIT

First, I checked all the parts thoroughly; this helped me to become familiar with the pieces and find out if any were missing. The kit was designed and manufactured in Germany, and the instructions are printed in four languages. (The English translation leaves a little to be desired.) Many of the parts look familiar, but they're labeled with strange names, e.g., a "grubscrew" is a setscrew for a collar. It took a phone call to Robbe to determine that the "white spirits" used to clean the hull prior to painting was actually alcohol. The parts are numbered and grouped in plastic bags, and only one metric setscrew was missing. I called Robbe about this, and the setscrew arrived in the mail two days later—pretty good customer service.

The instructions are grouped into steps, and the first digit of the part number corresponds to the step in which it's used—a concept that works well:

- Step 0: assemble a strong boat stand using Robbe's pattern and some scrap wood. To prevent the hull from being scratched, cushion the stand with a piece of felt.
- Step 1: use basic soldering tech-

niques to attach the filter capacitors and the power leads; then insulate them with shrink-tubing.

Next, drill the holes in the rear buoyancy hull cap. The pushrod holes call for a 3.2mm drill bit; the decimal equivalent is .12598 inch, so use a 1/8-inch drill bit. The hole for the stern tube calls for a 6.5mm drill bit (.2559 inch), so use a 1/4-inch drill bit. Carefully file the hole until the stern

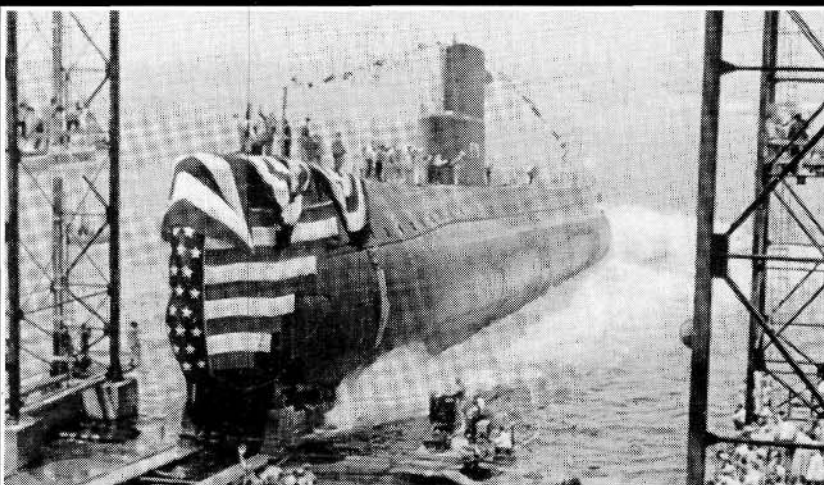
tube can be forced through the cap.

I had to use a rat-tail file on the bottom of the lubricating nipple holder to contour it to fit the drive shaft. Insert the motor assembly through the stern cap, and solder the nipple holder to the stern tube. Drill into the stern tube through the inside of the nipple holder, and clean the tube with compressed air and some solvent. Epoxy the grease fitting into the holder, but be very careful not to crush the stern tube; it's a very tight fit.

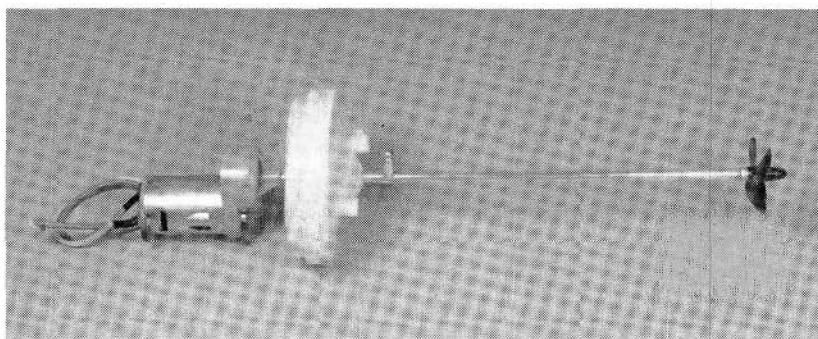
There was nothing in the instructions on how to remove the die-cut ABS parts. I spoke with someone at Robbe, and he suggested that I go over the scored lines with a sharp hobby knife, then flex the material until the parts separate from the sheet. This worked well with the thin sheet, but the larger, 3mm sheet was much more difficult to work with. I drilled tiny holes at the corners of each part, and this helped to prevent them from tearing when I flexed the material.

● Step 2: the equipment-tray assembly is straightforward and goes together quickly and easily using the recommended adhesives: CA or Stablitz Express*. (Stablitz is specifically formulated for this material.) To ensure that the tray was square, I lined the pieces up with a couple of aluminum triangles, and I used CA with accelerator to secure them. I sanded the parts and smoothed the rough edges.

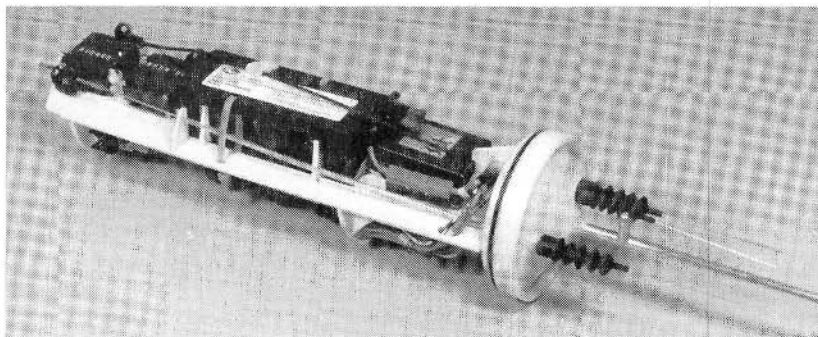
● Step 3: the buoyancy hull goes to-



The U.S.S. Seawolf—the world's second nuclear-powered submarine—was built by the Electric Boat Division of General Dynamics Corp. of Groton, CT, and launched on July 21, 1955. The Seawolf was similar in many respects to the Nautilus (SSN-571)—the world's first nuclear sub.



The gear-reduced motor, prop shaft, shaft housing and watertight bulkhead ready to be attached to the equipment tray.



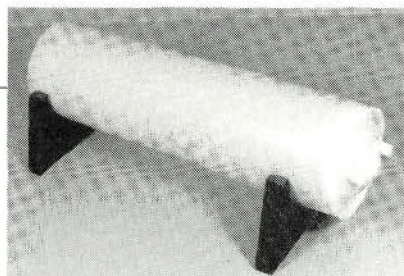
The equipment tray ready to be fitted into the pressure hull. Note the watertight "boots" for the pushrods and the O-ring around the bulkhead.

Sea-Wolf

gether quickly and easily. For a smooth finish, sandpaper the joint. The pieces should fit snugly, but not too tightly.

● Step 4: the pieces labeled "part no. 4.1" for the battery don't fit. The instructions call for the 2mm-thick die-cut parts to be sanded to fit the 1.5mm slots in the battery pack. The problem was that the slots measured 5mm. I used some scrap, 4mm ABS sheet, cut out new parts and attached them with Stablitz Express. I didn't use the recommended CA because it doesn't adhere to the battery-pack material. Roughen the surfaces before bonding them, or the Stablitz Express won't hold.

I substituted a toggle switch for the battery on/off slide switch. The toggle switch required a 1/4-inch hole instead of the slot on part no. 2.14. Rather than bending the pushrod ends to fit the servo



The pressure hull is made of strong plastic, and it didn't leak, even at a depth of 15 feet.

mounted it completely inside the buoyancy hull, to avoid making one more hole in the hull and another potential leak.

"Robbe's Sea-Wolf is a good entry-level R/C submarine kit. It's well-engineered and capable of exceeding the operating limits set by its manufacturer."

● Step 5: the assembly of the rear control planes is critical. Robbe's highly accurate, yet simple method of aligning this component is brilliant. The parts just slide into dovetailed slots on a symmetrical centerpiece. That's it—they're perfectly aligned. Make sure you position the control plane properly on the drive shaft.

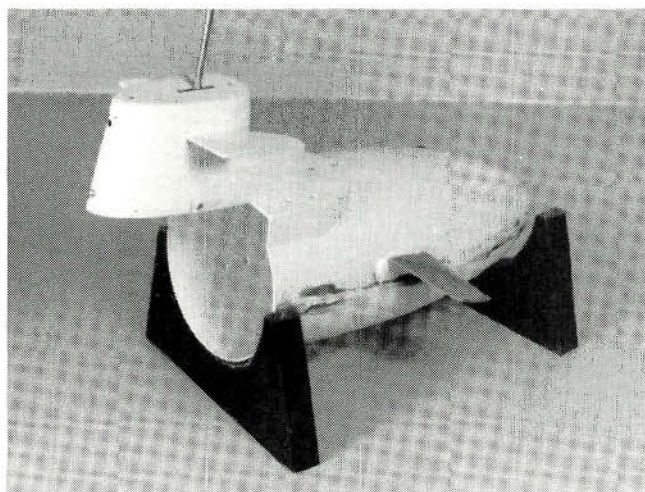
The external hull parts were next

and, once again, I used the score-and-snap method. (You can use a pencil to highlight the cutting lines.) Score the lines lightly with a new hobby knife. Don't try to cut out the part in one pass; several light cuts are more accurate. Once scored, flex the part until it snaps away along the scored line.

First, I pilot-drilled the vent holes with a 1/16-inch bit held in a pin vise, and then I opened them up with a 1/8-inch bit. Finally, I deburred the inside of the hull, attached the stern's bottom piece and connected the control linkages. At this point, I double-checked the performance of all R/C operations, and I adjusted all the servos to neutral.

● Step 6: to allow water to enter and air to exit the free-flooded sections, I drilled more vent holes into the upper external hull. Then I glued the joints and filled the seams with spot putty. Before priming and painting, I sanded the hull to a smooth finish.

● Step 7: I attached the conning-tower

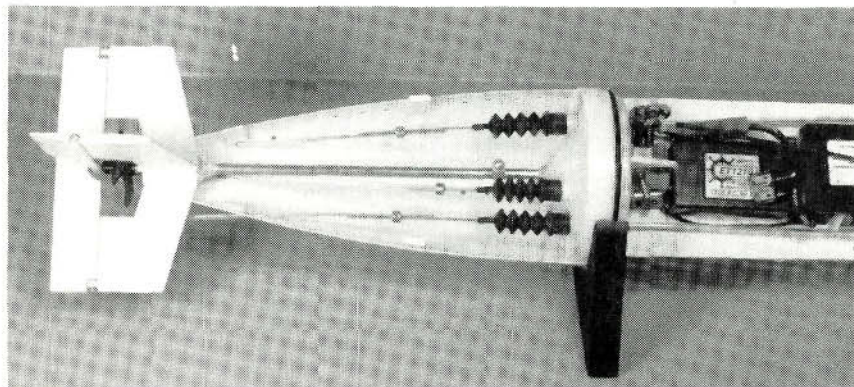


Left: The forward outer hull with the dive planes in place. The holes allow this section to free-flood.

Below: This view shows the neat, straight-line arrangement of the pushrods and the drive shaft.

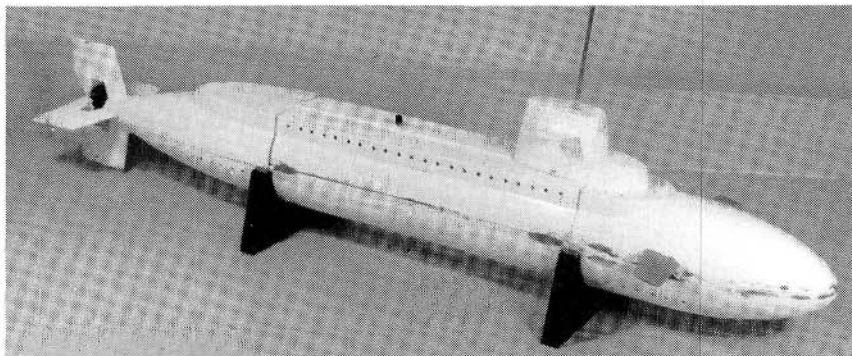
output arms, I soldered on threaded adapters and used ball links. I also mounted the servos with brackets instead of with servo tape.

To install the radio, I used servo tape to attach pieces of Velcro® "loop" to the insert plate. I fastened the Velcro® "hook" to the receiver and the controller so I can remove the radio for servicing and adjust its position for precise ballasting control. I chose a 12-inch, base-loaded, whip antenna, and I



TOOLS AND SUPPLIES

- hobby knife
- screwdrivers—straight blade and Phillips screwdriver
- soldering iron and solder
- wire cutters
- rat-tail file
- drill bits (see enclosed chart)
- Allen wrench
- sandpaper—280 and 400 grit
- silicone grease
- CA
- Stablitz Express glue



The completed model ready for paint and detailing. Putty was used to clean up the seams and the joints.

assembly and the forward depth vanes to the hull.

• Step 8: the installation of the automatic depth-control mechanism in this stage completes the control-surface system. This device has a spring-loaded arm that's connected to the radar antenna and linked to the forward planes. Once I had adjusted it, the assembly was almost complete.

I sanded the boat, primed it and filled the imperfections with putty. To make the sub visible under water, I painted it with "safety yellow." (I chose a research version for this sub; not a military one.)

The instructions call for sheet-lead ballast, but I used lead shot to trim out the boat because I can place it more precisely. I glued the lead shot into small trays made of scrap ABS; then I put the trays into the bow and the stern compartment.

SHAKEDOWN CRUISE

The paint was barely dry when I launched the sub for its trials in the indoor swimming pool of a nearby hotel. If you really want to attract attention, walk through a hotel lobby on a Saturday afternoon in February with a yellow submarine tucked under your arm. (Yes, I received permission from the management.)

I put the boat in the water and gave it few shakes to dislodge the air that was trapped in the free-flood areas. It settled into the water trimmed and ballasted to specs (my bathtub at home had seen to that).

I gave the radio system a quick check and trimmed the control surfaces. I nudged the throttle forward, and the sub started to move. As I increased the speed, it started to dive. It's difficult to describe the feeling the first time you intentionally run an R/C model under-

water. A little "up" on the control planes, and it bobbed back to the surface. It worked! Overconfidence set in.

When you operate an R/C surface craft, you think in terms of forward, backward, left and right. With submarines, you have to think in terms of up and down, and you have to pay close attention to what you're doing. Once you've lost the exact position of a submerged vessel, it takes a while to find it. When I "lost" my sub, its bow hit the pool's concrete wall. The impact was enough to knock off a chunk of plastic the size of a quarter

tion of research submarines is DSRV (Deep Submergence Research Vehicle) followed by a number. I designated this boat SSRV-91 (Shallow Submergence Research Vehicle-91) since it was designed for shallow operations. Back to the test tank...

TORTURE TESTING

I knew the boat would do what it was designed to do; I decided to find out whether it was capable of more. A friend and I lugged the boat, an underwater camera and about 200 pounds of scuba gear back to the pool. (If you're going to take a picture of a submarine, do it underwater.)

I reset the automatic depth control so that I could override it. The boat operated well to a depth of 3 feet. At that point, the receiver lost the transmitter's signal, the motor stopped and the sub slowly rose to the surface. When the receiver regained the signal, the sub started again. The pool's high level of chlorine prevented the radio

Drill-bit conversion table: Metric to American Standard

Metric	Decimal equivalent	Drill-bit size
1.0mm drill	.0394	
1.5mm drill	.0591	no. 53 drill bit (.0595)
2.5mm drill	.0984	no. 43 drill bit (.089)
3.2mm drill	.1256	no. 30 drill bit (.1285)
5.3mm drill		no. 4 drill bit (.2089)
6.5mm drill		1/4 drill bit, then file to fit

and split the bow seam open.

At home, I repaired the sub with a drop of CA, some body putty, sanding and spray painting. I accented the paint scheme with black, 1/8-inch-wide, automobile trim tape. The stripes dress up the hull and conceal the seams and screws that hold its halves together.

At this point, I decided to give the model an identity. The Navy designa-

signal from penetrating the water any deeper than 3 feet, but the sub withstood the pressure at 11 feet without leaking. The next test was held outside in the "real world."

I had permission to operate the sub at a scuba-diving facility in a flooded quarry. When I arrived, there must have been over 100 rubber-suited divers in and around the water. (Any time you

(Continued on page 118)



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SP-10 UPDATES

(Continued from page 112)

additional wheel adapters (weight!). And, while I'm at it, toss the wing mounts!

The front suspension works quite well on any surface, but I'd like to see more refinement for the rear end. The diff is really tricky, but perhaps you could add a sway bar, variable spring rates (for the damper) and built-in tweak adjustment. With the competition coming in under weight, there's no excuse for being heavy.

CORALLY CREDIT

Now let's give credit where it's due. Corally recognized the need to get into the U.S. oval scene. The company has produced a number of excellent components, but you don't run a Group C car against a NASCAR stock car on an oval. The SP-10 can be an exceptional road-racing car, but to be competitive, you might need a purpose-built oval car, rather than a conversion. Given time and practice, however, the converted car can be made to work on a banked concrete oval; it just takes a little extra effort.

*Here are the addresses of the companies mentioned in this article:

Corally; distributed by Du-Mor R/C, 1002 Union Landing, Cinnaminson, NJ 08077.

Max-Cell, P.O. Box 1211, Mt. Laurel, NJ 08054.

B&R Motorworks, 28000 Tothill Dr., Saugus, CA 91350.

SEA WOLFE

(Continued from page 117)

want to draw a crowd, unload a bright yellow submarine from your car.)

The water was cold, clear and deep. My safety diver was suited up and in the water. I launched the sub; we took it down, and it ran well to about 15 feet. The clear water and the sub's bright yellow color made it visible at all times. The sub can handle greater depths, but the radio signal can't reach the receiver. Remember, this was a controlled test in open water with a recovery team of almost 100 fully equipped divers standing by. Please don't attempt this.

Robbe's Sea-Wolf is a good entry-level R/C submarine kit. It's well-engineered and capable of exceeding the operating limits set by its manufacturer. The instructions are, at times, confusing, and references are made to Robbe's main catalogue, even though it isn't supplied. Also, the 40MHz-band radio that's suggested may be all right in Eu-

(Continued on page 120)

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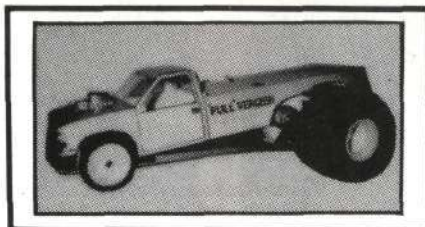
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SEA WOLFE

(Continued from page 118)

rope, but you can't use it in the USA.

The only specification given for the drive battery is a part number that the local hobby shops couldn't cross-reference. Robbe sent me a 6V, 7A, sealed, lead battery that's the same as Radio Shack's Gates battery.

There was no mention of running the motor prior to assembly, but this would improve its performance. The sub's power is more than adequate; it can run

fast and, at times, can be tricky to maneuver. Like a full-size sub, the Sea-Wolf's turning radius is poor (this is characteristic of long, narrow boats.)

Overall, the Sea-Wolf's design is good, and Robbe makes no exaggerated claims. Now I'm hooked on submarines—a thumbs-up for the Sea-Wolf. If you want to skipper a U-boat, this might be just the one to try. See you at the pond.

**Here are the addresses of the companies mentioned in this article:*

Robbe Model Sport, 180 Township Line Rd., Belle

Mead, NJ 08502.

Stablitz Express; distributed by Robbe, Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

BODY DETAILING

(Continued from page 89)

straightedge because the seams are molded in—just run a marker along the molded grooves.

BODY BEAUTIFUL

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(Continued on page 122)

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BODY DETAILING

(Continued from page 120)

same techniques as those used on stock-car bodies. Using the Coverite Presto and a hole punch, I made a realistic gas cap for the Associated Viper body. To create the stars, I masked the body's interior with Coverite graphics before I applied the paint. These graphics are self-sticking, though, so I could have applied them to the body's exterior just as easily. To make the "rivets" around the windows, I dipped a toothpick (a pencil point will work, too) into silver paint and dabbed it on the body in the appropriate spots.

One of my favorite detailing tricks is to draw louvers, access doors and anything else I can think of using a fine-point permanent marker guided by drafting templates. Most art-supply stores sell templates with a variety of designs on them, and this makes drawing small details very easy.

Good luck! I hope this series of articles will help you achieve the painting and detailing results you want.

If painting and detailing your own body seem like too much work, but you still want a super-looking body, then contact the people at Motion Graphics.

They'll do it all for you (even supply the body!), and it will only take a few weeks.

**Here are the addresses of the companies mentioned in this article:*

Motion Graphics, 2645 Robert Arthur Rd., Westminster, MD 21157.

Associated Electrics Inc., 3585 Cadillac Ave., Costa Mesa, CA 92626.

Coverite, 420 Babylon Rd. Horsham, PA 19044.

Autographics of California, 7401 White Ln., #1, Bakersfield, CA 93309.

Custom R/C Graphix, 4138 Boston Rd., Bronx, NY 10475. ■

SCREAMIN' STOCKERS

(Continued from page 46)

poles of an electric motor's armature is protected by a coating of epoxy. Motor sprays that contain harsh solvents will eventually remove this epoxy and cause the copper wires to short out. So be careful when you select a motor spray; the money you save by using a "bargain" spray may eventually cost you the price of your motor.

With the brushes removed from their hoods, spray the commutator, the brush hoods, the brushes and the bushings. Although some people think that it's not a good idea to use motor spray on Oilite

bushings (they think that the cleaning solvents will "dry-out" the bushings), I think that it's important to rid the bushings of any dirt that may be lodged between their inner surface and the armature shaft because the dirt will accelerate wear.

As an alternative to motor spray, there are several brands of motor "baths" that allow you to submerge a running motor in chemical solvents for a thorough cleaning. Paragon*, Bolink*, and Bel-Ray* are a few of the companies that offer them.

STICK IT!

When you've cleaned your motor, use commutator cleaning sticks to remove carbon deposits from the brushes and the comm. These sticks are a must if you want your motor to last longer than a handful of races, and a wide variety is available. I recommend that you arm yourself with a fine-grit stick and a coarse, abrasive one.

Clean the commutator's surface first. Insert the rectangular end of the fine-grit stick into the brush hood (obviously, the round end won't fit; please just bear with

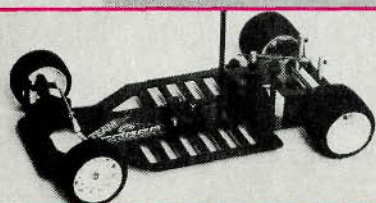
(Continued on page 130)

TEAM COBRA SMOKES 'EM AT THE WHIP!!!! 1991 LAKE WHIPPOORWILL U.S. OVAL MASTERS

John Broesler, TQ/Wins the A MAIN MODIFIED, wins the A MAIN STOCK!

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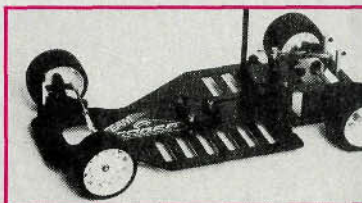
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RACING REQUIRES TOTAL concentration, and R/C car racing is no exception. Any R/C racer will tell you how difficult it is to maintain complete concentration from the start of a race until the checkered flag descends.

Even a short qualifier can strain your brain and rack your nerves, so can you imagine an *hour* of intense racing? Every curve becomes an obstacle; your "death grip" on the radio leaves your hand numb; and your eyes water and

5
Hours
of
flat-out
fun

Bill Campbell Memorial

Enduro

by JEFF BRONSTEIN

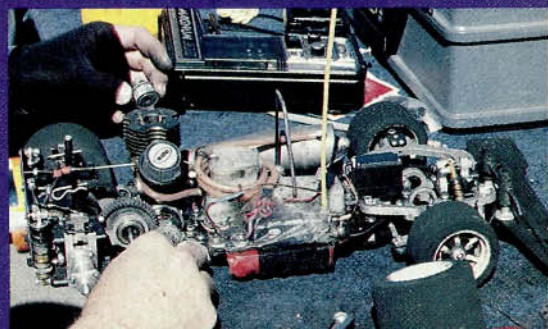


Top: one-eighth-scale racers often sport beautifully detailed bodies. Here are the top finishers in the Concours competition.

■ Above right: Goofy (at right) made his 1/8-scale driving debut. (Usually, he races 1/12 scale!)

■ Left: the 10 teams, each with one car and three drivers, prepare for the start of the "Killer Enduro."

■ Right: as testimony to the durability of these nitro-burners, most of the cars in the Enduro finished the race.



Enduro

strain as you try not to blink for fear of crashing. Now, picture 10, 1/8-scale gas cars being raced for *five hours* straight, and you have the Campbell Memorial Endurance Race!

At one time, the "Enduro" was an 1/8-scale tradition, but for a while, the popularity of electric cars stole the spotlight from gas cars. Owing to the resurgence of gas-car racing across the nation, however, the Campbell Memorial has been resurrected.

Held in Albuquerque, NM, by the New Mexico Radio Control Race Car Club, this year's Endurance race was

sponsored by Delta, Associated and CAM-2. It commemorates one of R/C's legends: Bill Campbell, one of the founders of Delta Mfg. and designer of one of the

The teams agreed that the New Mexico Radio Control Race Car Club did an excellent job running the Enduro...

first R/C cars. Today, Delta remains very active in R/C racing. Ken Campbell and Delta R&D man Ed Baines demonstrated a prototype 1/10-scale gas car that they've

been developing. It seemed to handle very well on the track, and its speeds were blistering.

THE STUFF "ENDURO" IS MADE OF

Ten three-person teams had to run the same car for the entire race. No backup cars were allowed, so broken or damaged cars had to be repaired. Each driver had to run for at least one hour during the race. Being able to change tires, receiver batteries and drivers quickly was critical.

All the cars in this race were 2WD because the teams were willing to sacrifice the slight speed advantage of 4WD cars for the dependability of 2WD cars. Contrary to those who think 2WD is for

beginners, many 1/8-scale drivers prefer 2WD for its racing "purity." In general, 2WD cars are easier to maintain and more affordable.

ENDURING ESSENCE

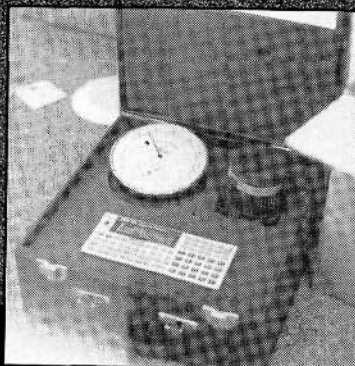
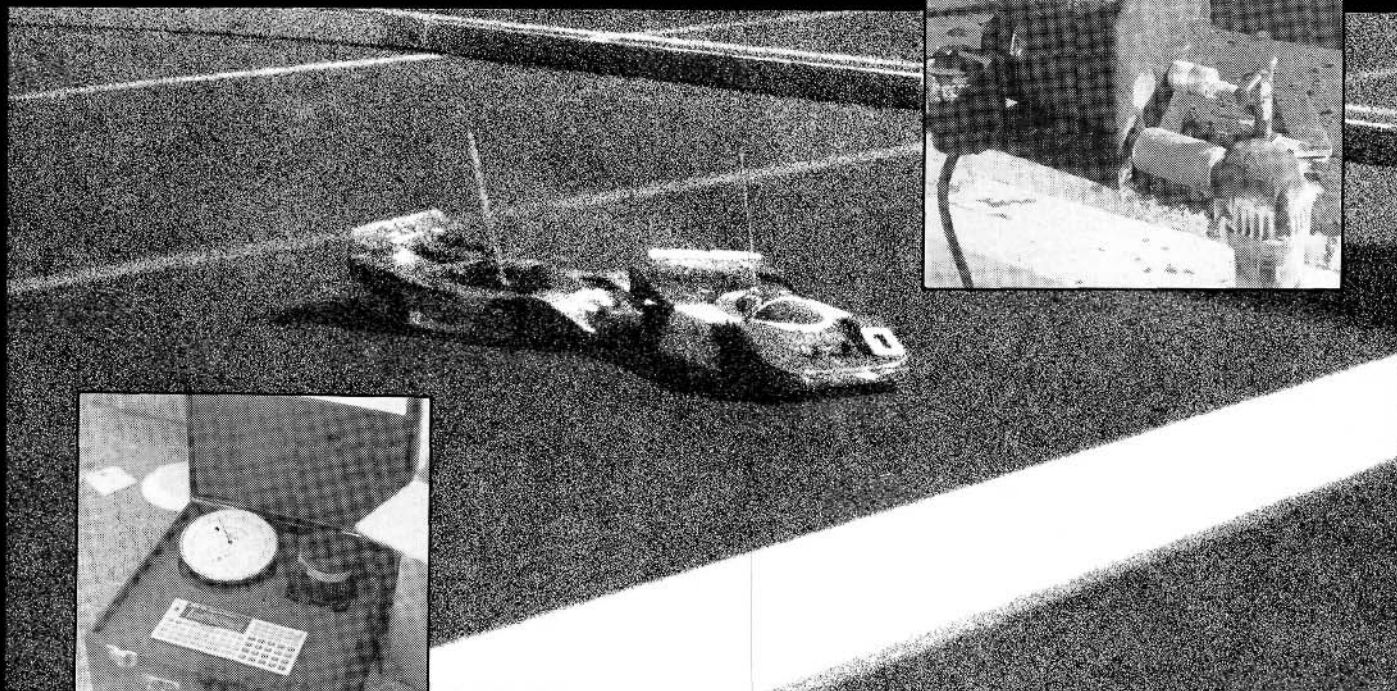
After a day of practice and track preparation, the race began with a bang! In the first hour, there were so many lead changes that there's not enough room to list them all here! The traction on the perfectly prepared asphalt track was unbelievable, yet tire wear was minimal. Volunteers from the local 1/10-scale club worked as corner marshalls and statisticians, and they kept the race going.

At the halfway point, the field had spread out slightly, but all the cars were still

(Continued on page 134)



To race successfully in 1/8-scale, you need support equipment. Under the layer of rubber shavings, there's a precise tire-truing machine. ▶



◀ This gauge measures tire firmness.

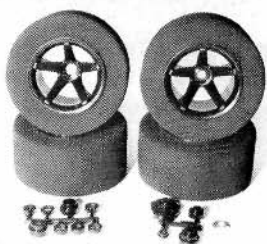
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SCREAMIN' STOCKERS

(Continued from page 122)

me!). Rotate the armature's output shaft (attaching a pinion gear makes this easier) while you apply *slight* pressure to the comm stick. Beware: if you exert too much pressure on the comm stick, you may damage your commutator! So go easy. After four or five revolutions of the armature, remove the comm stick from the brush hood and clean its surface by rubbing it on a rag moistened with a shot of motor spray. For excessively dirty motors, you might have to repeat this process.

When you've cleaned the commutator, the brushes are next on the agenda. When you run your motor under load (in your car), the surfaces of the brushes actually liquify, and this causes a buildup of the brushes' natural lubricants, or "glaze." If this layer builds up, it can hamper the brushes' performance; it's therefore a good idea to periodically "de-glaze" your brushes. Use the more abrasive comm stick, and slowly work its round end back and forth across the surface of the brush in the direction that the commutator spins. It takes only a few rotations to de-glaze the brush, so don't overdo it, or you may distort the brushes' contact area and have to break-in your motor again.

OIL CRISIS

Take a deep breath—you've almost finished! You only have to re-install the brushes in their respective hoods, re-attach the brush springs, and last, but not least, re-oil the bushings. There's not much to say about this step, except that it only takes a drop or two of oil to penetrate the Oilite bushings thoroughly. I've seen people who absolutely saturate their bushings with oil: they get oil everywhere—on the commutator, on themselves, in their toolboxes; you name it, they oil it. What's the point? A little oil will do the job.

As you can see, it doesn't take a great deal of time or effort to keep your stock motor in top condition. The more familiar you become with the steps involved, the faster you'll be able to clean your motor. If you follow an organized procedure, it will become second nature to you.

*Here are the addresses of the companies mentioned in this article:
Paragon Racing Products, 690 Industrial Circle So., Shakopee, MN 55379.
Bolink R/C Cars Inc., 420 Hosea Rd., Lawrenceville GA 30245.

(Continued on page 134)

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SCREAMIN' STOCKERS

(Continued from page 130)

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Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.
Trinity Products Inc., 1901 E. Linden Ave., Linden, NJ 07036. ■

ENDURO RACE

(Continued from page 127)

running. With average lap times in the low 20s, most teams had completed more than 250 laps. Team Delta, which consisted of 2WD National Champion Dave Campbell, 4WD national and world contender "Hatch" Hashimoto and Georgia Campbell, one of the Delta Mfg.'s founders, didn't hold anything back. They set several single-lap records.

Representing the "heart of America" were two teams from Lincoln, NE, and they put on an excellent show for their first Enduro race. One team was made up of electric-car racers who had assembled their car only days before the race! Jerry Weaver, Bryan Godfrey and Jeff Kilbreth of Team WGK also challenged Team

Delta for the top position. The Old-Timers team, which was made up of gas-racing veterans, also ran strong. Rich Cunningham, who has been racing for more than 20 years, drove one of his best races ever! Davy Preston, one of the youngest 1/8-scale drivers, drove a perfect line around the track—lap after lap.

ELOQUENT ENDURANCE

While driving for Team Delta, Dave Campbell suddenly collapsed on the drivers' stand, but the race continued when it was determined that only his legs had given out owing to the tension and physical strain. While Team Delta was recuperating, several cars overtook theirs, and by the time they regrouped, they were in 5th place. Team WGK inherited the lead, and it looked as if they planned to keep it. Team Delta's car was obviously the fastest on the track, but mechanical problems kept it off the pace.

That afternoon, as track conditions improved, other teams moved within striking distance of the leader. To everyone's amazement, Campbell drove to 2nd place from the back of the pack. Team Delta's car cornered only fractions of an inch from the corner markers. With less than a half hour left, Team WGK led

Delta by 16 laps. As long as their car held together, WGK had the race in the bag. With Kilbreth at the wheel, their car was handling perfectly; then, in the last 15 minutes, it spun a belt gear, and the team was forced to make a pit stop. While they worked feverishly to install a new gear, Team Delta cruised by and regained the lead. Team WGK re-entered the race, but only in time to salvage 2nd place. Campbell finished in 1st at 5:01:09.4 with 679 laps—29 laps ahead of Team WGK.

After the race, the huge crowd of spectators was allowed to inspect the 10 cars and congratulate the winners. Several drivers fell to the ground next to the drivers' stand, exhausted from the race. The teams agreed that the New Mexico Radio Control Race Car Club did an excellent job running the Enduro, and that the race would be held again next year. It was also agreed that during the five-hour race, the drivers experienced some of the best racing ever. ■



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(Graph shown represents actual readout of Reedy Modifieds motor)



NITRO NEWS

by JEFF BRONSTEIN

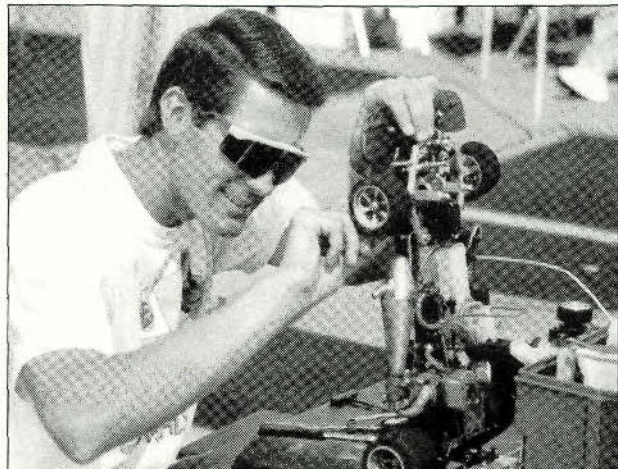
Gas is a blast!

This new monthly column will give you tech tips, competition highlights and all the latest news and relevant information about the resurgence of gas racing around the world.

Combustion-powered racing isn't a new R/C development; in fact, it began long before anyone had even conceived of ESCs, peak-detection chargers, or proportional radio systems. Back in the mid '60s, when today's top electric drivers like Joel Johnson and Cliff Lett were still playing with GI Joe, a group of Californian slot-car fanatics were testing a 2-stroke model airplane engine in a make-shift race car. Needless to say, their first car wasn't very successful, but the idea caught on instantly. Soon afterward, the Thorp R/C Raceway in Pomona (now the Ranch Pit Shop) was opened; racers from all over the West Coast took their cars there and witnessed the start of something new. Electric racing wasn't invented until almost 10 years later, when a gas car was fitted with a DC motor.

DO YOU HAVE GAS?

Much of the R&D behind recent electric



Probably owing to its higher cost and more sophisticated car designs, gas racing generally appeals to a slightly older audience than electric racing does.



racing has also improved gas-racing technology. Today's gas car employs a two-speed transmission, a highly adjustable independent suspension, an advanced ball diff, disk brakes and a sound-snuffing reflex tuned-pipe exhaust system. These new nitro-breathing speed demons are handfuls of sheer racing terror. Regarded as the Formula 1 of R/C, gas racing is as close to the real thing as you can get. It may be the larger size, or the smell of nitro, or maybe the sound of a 2-stroke engine accelerating through a wide-out chicane; you just haven't done it all until you've tried combustion power.

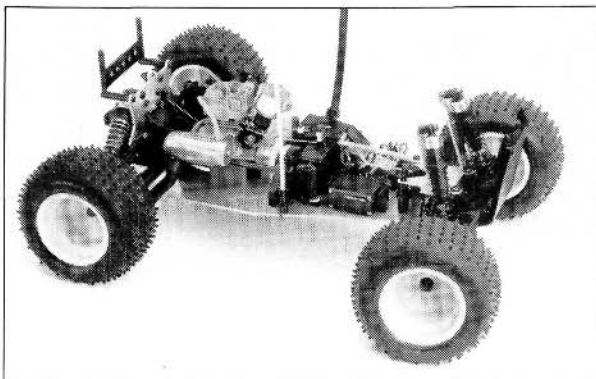
Although the cars are referred to as "gas" cars, they actually burn a nitromethane and alcohol mixture that's similar to that used in Top Fuel dragsters. Fuel-powered cars offer high performance and realism without the drawbacks associated with batteries, chargers and speed controllers. Without the dreaded "dump," the smooth power of a 2-stroke engine is consistent from the first drop

of fuel to the last. Quick-fill fuel tanks allow main events to extend for as long as an hour, and endurance events of as long as 24 hours aren't unheard of. In the past, micro-engines were unreliable, but their current technology is superior in quality, reliability and performance. A typical engine will develop over 2hp at over 30,000rpm.

THE GASEOUS CROWD

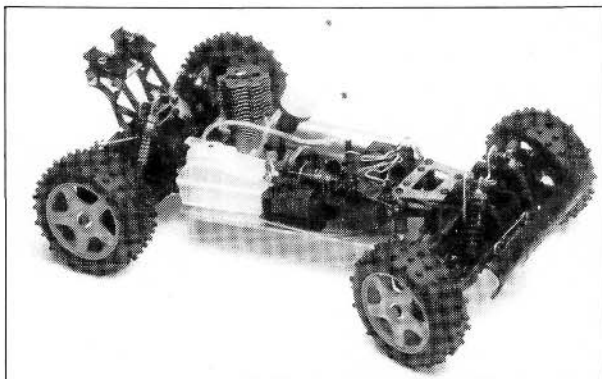
There's a common notion that gas racing is more expensive than electric racing; to some extent, this is true. The initial cost of the car, the engine, the starter and the basic racing gear is substantial, but over the long-run, costs seem to even out. Highly competitive racers of 1/10-scale vehicles can invest hundreds (even thousands!) of dollars in batteries, chargers, motors and other "essentials"; the average gas-car racer rarely uses more than one engine.

Aside from basic maintenance, the only regular expenses are tires and fuel (of course, true board-bangers will incur some additional repair expenses). Some recent statistics even show that a competitive gas setup is less expensive than a comparable electric outfit.



One of the newest trends in R/C is the conversion of 1/10-scale electric buggies and trucks to gas power. Here's Kyosho's 1/10-scale gas off-road Outlaw Ram-page truck.

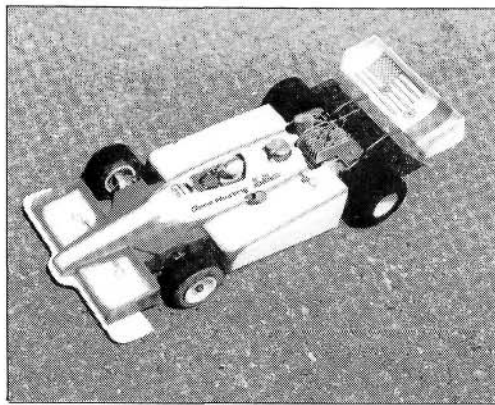
Right: One-eighth-scale, off-road gas racing has enjoyed a recent surge in popularity. The Kyosho's 4WD Turbo Burns leads this pack of competitive nitro dirt-burners.



This form of racing isn't for everyone; it takes a fair amount of time, effort, mechanical aptitude and driving skill. A few loyal groups of this rare breed of driver have kept the sport alive while electric racing held the spotlight. Most gas racers are concentrated in circuit or on-road racing, but one major manufacturer is currently promoting the growth of the gas off-road circuit as well.

There are three classes of on-road, 1/8-scale gas racing: pan car, 2WD and 4WD. Pan cars represent the basic flat-chassis, no-suspension class. This class represents the "roots" of R/C racing and it's still alive today. The cars are less expensive, but they don't handle the power like the newer suspension classes.

The 2WD and 4WD cars employ full 4-wheel, independent, wishbone-type suspensions (very similar to those on many 1/10-scale off-road cars) complete with state-of-the-art oil-filled shocks and sway bars. For racing purists, i.e., those who enjoy emulating actual racing, 2WD is the ultimate test; it most closely reproduces the setup and handling of full-scale racing. Although once considered a "novice" class, 2WD actually relies more on style than on power, and it's much less forgiving than 4WD. Unfortunately, IFMAR doesn't recognize a 2WD world champion. There is, however, a ground swell to organize an "outlaw" 2WD championship in the near future.



Above: In the early days, before 4WD cars, gas racers ran these fairly primitive, suspension-less 2WD pan cars. This RC-200 belongs to Gene "Mr. Associated" Hustings.

GO, SPEEDRACER, GO!

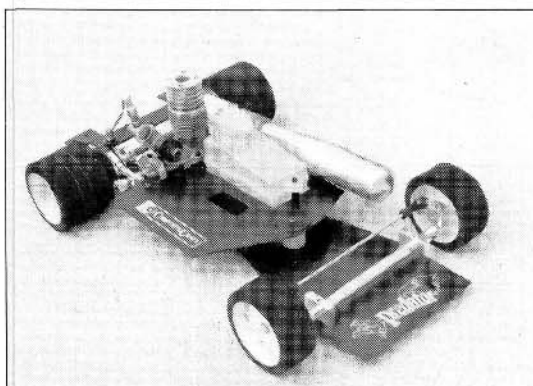
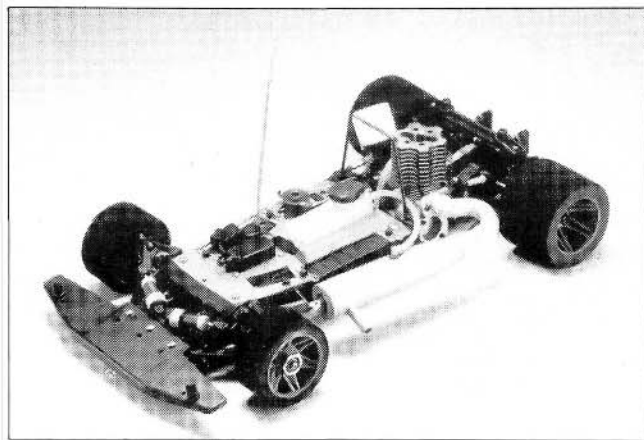
The World Championships, which are held every two years in different locations around the globe, test the best of the best in the fastest R/C race anywhere. (This year the IFMAR 1/8-Scale On-Road Worlds will be held in Austin, TX.) Once an R/C racer has reached this class of racing, competition takes on a whole new meaning. The 4WD, or "All-Wheel Drive" cars corner and accelerate faster than 2WD cars, and fine-tuning is especially important. Tire diameters are crucial to the overall performance of a 4WD car. Raw power is poured to the asphalt at all four corners. The rear wheels "overdrive" the fronts until the car loses traction; in-

stantaneously, the front-wheel drive picks up the slack. Mastering 4WD as a driver and as a mechanic is the ultimate R/C challenge.

Regarding off-road racing, Hobbico* and Kyosho*, makers of the Burns and Turbo Burns 4WD off-road cars, have been promoting the "World Challenge" race. The next race will be held at the Hobbico headquarters in Champaign, IL. The event pits "big name" sponsored drivers against one another and some lucky newcomers—all driving powerful 1/8-scale 4WD cars. When you get on these babies' throttles, they kick up some serious turf; spectators are even warned to

(Continued on page 152)

Right: The highest level of gas racing is the 1/8-scale 4WD On-Road Class. At speeds of over 60mph, the cars' handling and reliability become paramount. The current world champion, BMT/Blitz, will be the car to beat at this summer's Worlds.



Left: In an attempt to create a new racing class, Composite Craft and TRC have joined forces to produce a 1/10-scale nitro on-road car called the Python.

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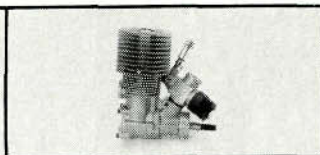
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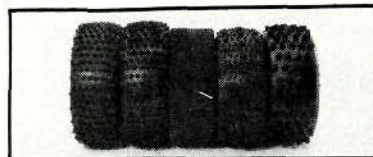
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NITRO NEWS

(Continued from page 151)

avoid sitting near the corners of the course! The 3.5cc engines used in on-road racing drive geared 4WD systems and 5-inch spiked off-road tires. These cars weigh up to 55 pounds and accelerate to top speeds of 55 to 60mph in less than 4 seconds.

Several manufacturers produce very competitive on-road, 1/8-scale car kits: Kyosho (BMT/Blitz), Associated*, Serpent* and Delta*, are dominant in the United States. Kyosho, Pirate*, Mugen*, Mantua* and BMT* all produce competitive off-road kits. A few others are developing cars, or have released pre-production models for testing.

EXPANDING GAS

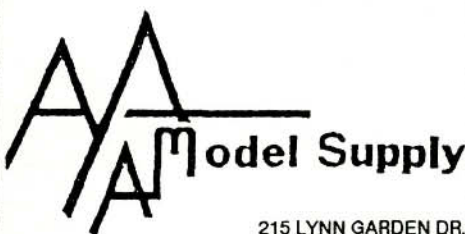
Getting started is the most difficult part. The initial tasks of setting up suspensions and fine-tuning engines can be annoying and complicated. Start at a local club or hobby shop by finding out which cars other racers in your area are driving. This is helpful for two reasons: first, when you break a part, it's always easier to borrow one from a friend at the track than it is to run to the hobby shop; second, advice from others with the same kind of car can make the set-up much less frustrating. Many techniques used in gas racing are the same as those used in electric, so electric experience is a plus, but be ready for more performance and speed; these

cars aren't 'five-and-dime' specials!

Gas racing is, at present, limited to 1/8 scale, but ROAR is gearing up to introduce rules and specifications for the new 1/10-scale gas racing. Many manufacturers have introduced, or have plans to introduce, their first 1/10-scale gas-powered cars and trucks for on- or off-road racing. The hopes are that gas racing will be as popular as, if not more popular than, the current rage of electrics. Before long, we may all be talking about cubic centimeters and displacement instead of milliamps and discharge rates! Don't go throwing your 10Ls and Lynx IIs out of the window just yet, though; the transformation probably won't happen overnight!

(Continued on page 153)

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LETTERS

(Continued from page 11)

MAYBE MICHIGAN

I've owned a Tamiya Hornet for about two years, and I've had nothing but problems with it! It runs well for about three minutes, and then I can hear the motor spinning, but the car doesn't move. I've taken the gearbox apart six times. I use stock gears, and I've replaced them three times. I'm really tired of buying new ones. Every time I fix the gearbox, the gears start to grind after a few minutes of running. Although I try to go easy on my car, the gears just don't last. Are there companies that make better gears for the Hornet? If not, how can I prevent the stock gears from grinding? I want to get this car running well enough to sell it and buy an RC10.

BRIAN BLASER
 Maybee, MI

I've read your letter twice, Brian, and frankly, I'm at a loss. The Hornet is one of the most durable cars I've ever owned, and believe me, I've owned quite a few! It could ram curbs and do full-tilt power slides—you name it—with very little damage! Although this car has long since been retired, its transmission is still in good shape.

There are three possible reasons for your car's drive-line failure. Perhaps you made a mistake when assembling it. Try installing yet another set of gears, but this time, follow every instruction step to the letter. Also, the transmission bushings may be worn, causing the gears to separate under acceleration. If so, you should replace them. I'm only guessing, but using a modified motor instead of the kit's 540 Mabuchi might also cause the gear-

(Continued on page 154)

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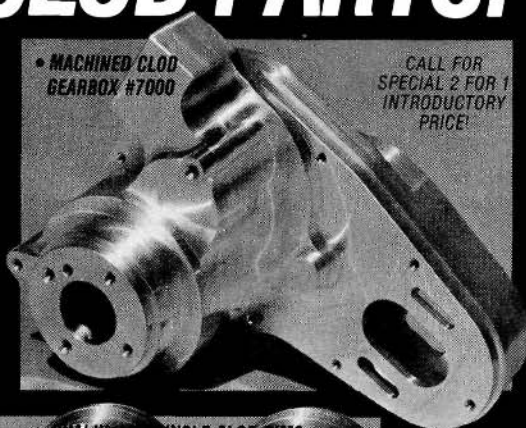
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LETTERS

(Continued from page 153)

stripping problem. The Hornet isn't designed to handle a hot motor, and using one could shorten the life of its transmission gears. JH

FULL COVERAGE

Do you ever go to events at small tracks, or do you just cover the larger ones like Whippoorwill? Does ESPN broadcast R/C car events? If not, why not? They cover every other type of car event.

BRIAN REUBUSH
Middlebrook, VA

We receive many letters like yours, Brian, and here's the story: each month, there are hundreds of races held all over the country. With so many types of racing (on-road, off-road, etc.), there's a national event held just about every week. We keep busy just trying to cover these large events! If we went to one small track and covered their event, we'd be flooded with letters from other tracks asking why we covered that particular race and telling us that their track is better, blah, blah, blah...get the picture?

ESPN should broadcast R/C racing regularly. I bet that many viewers would find it interesting and exciting. I know I would! FM

HE DID THE MASH!!

I own a Traxxas Hawk with a Monster Mash motor. A few months ago, I tried to buy a Futaba 112B ESC for my truck. When I told the dealer that I use a Monster Mash motor, he said that it would burn out the Futaba ESC. At the time, I believed him, but after reading your magazine and listening to other peoples' descriptions of

(Continued on page 155)

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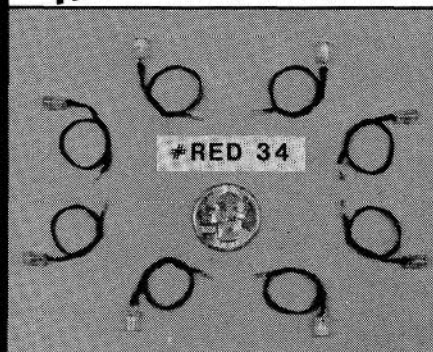
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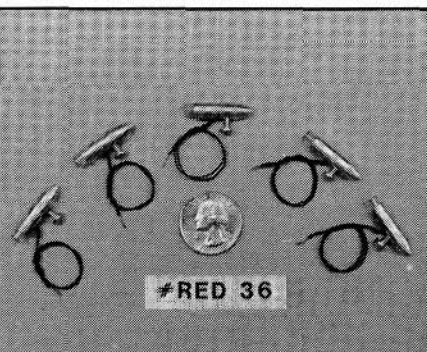
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LETTERS

their cars, I don't believe him anymore. My friends (and your magazine) say that this ESC can handle this motor or even a hotter modified motor. I don't want to prove anyone wrong; I just want to find out if the Futaba 112B can handle a Monster Mash motor. Your mag is the best on earth.

ASIF MIAN
Mahwah, NJ

Well, Asif, I have to agree with your hobby-shop dealer on this one. The Trinity Monster Mash motor is a 16-turn single-wind—a pretty hot modified motor. The Futaba 112B speed controller is designed for use with stock-class motors, and maybe, just maybe, some of the mild (20 to 24 turn) modifieds. Although you can probably use the 112B with a hotter motor, Futaba strongly advises against it. If you still want to use the Monster Mash, your best bet is to spend a little more for an ESC that can handle a hot motor without causing damage.

JH

STRIP TEASE

The transmission gears in my Outlaw Ultima racing truck keep stripping. The owner of my local hobby shop recommended installing ball bearings to solve the problem. I did this, but my gears still stripped! Also, does the Camino 2000 racing-truck body (page 10, July '91 issue) fit the Schumacher Shotgun truck? Please help!

ROBBY DUFALO
Anchorage, AK

It sounds as if you have quite a dilemma, Robby. Since you've installed bearings, and the tranny gears are still stripping (I'm assuming that you've also installed a new set of gears), the only thing that comes to mind is that your motor might be too powerful for the Outlaw's gearbox. The big monster-truck tires often put extra strain on a truck's gearbox, and this speeds up wear and even causes premature breakage. It's important not to use too much horsepower in your truck; it only causes problems. Dahm's Camino 2000

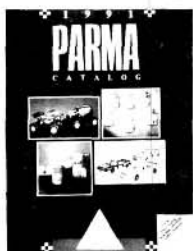
(Continued on page 158)

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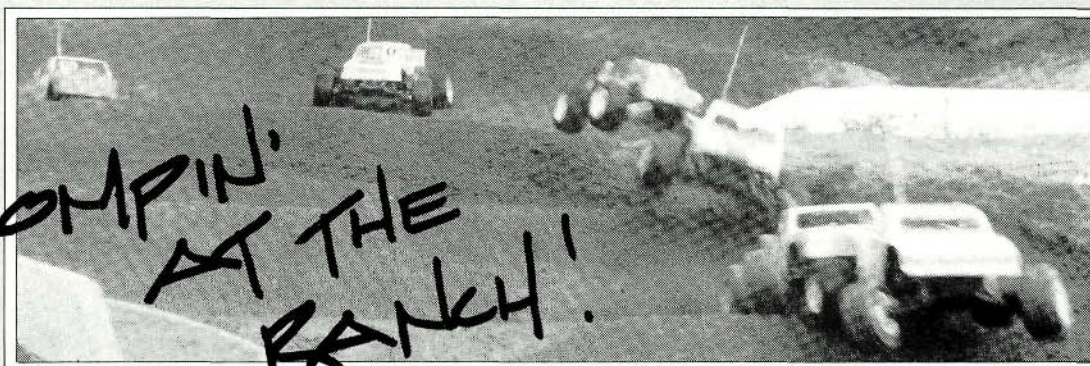


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WEST COAST MONSTER TRUCK CHAMPIONSHIPS



PHOTOS BY GARY KYES

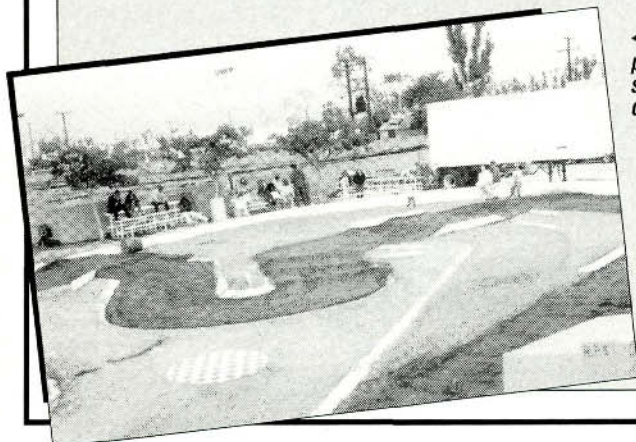
by GARY KYES

The Ranch Pit Shop has a rich history in R/C racing. As the premier racetrack/pro shop of the '80s and now the '90s, the Ranch has seen and made R/C racing history. For the last few years, this facility has been absent from the national racing scene, largely because owner Gil Losi and his management team have been busy building Team Losi! With Team Losi operating smoothly, and with the addition of new, key, race-experienced managers, I'm here to tell you the Ranch is back!

The West Coast Monster Truck Championship is one of the largest truck-only championships around; in fact, this ultra-popular event was filled so quickly that many

entry forms had to be returned. The people at the Ranch added fresh dirt and totally rebuilt their famous, permanent off-road track, so now it features a little of everything: a straightaway, table tops, rollers, a drop off, a rhythm section and, of course, some crowd-pleasing monster air doubles. Because this was the first major event at an outdoor track in some time, it was a learning experience for many of the West Coast racers; they learned that the changing conditions of outdoor tracks make them extremely tough to conquer!

The Ranch crew also tried to make this competition great fun for all with the inclusion of the very well-received



◀ The track's layout was perfect for trucks—large sweeper turns and lots of challenging obstacles.

The Seniors' A-Main. Who says only the kids have fun? ▶





Modified A-Main winners (from left): Ron Rosetti (2nd), Jon Anderson (1st) and Brian Peterson (3rd).



Young Alex Chavez was one happy camper. He not only drove his Losi JR-XT to TQ, but he also won the Junior Class.

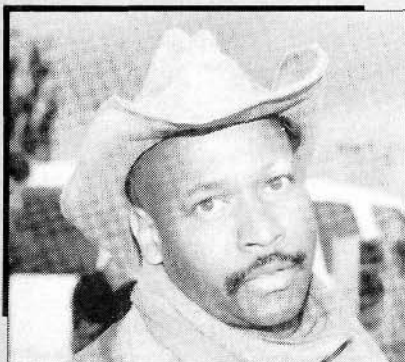


The 4WD winners (from left): Jeff Whitman (2nd), Jack Johnson (1st) and Nichelle Rivera (3rd).

Junior and Senior Stock Classes. They were crowd-pleasers, and I hope that other race promoters will encourage these exciting new concepts.

FIRST WE PRACTICE...

Friday was dedicated to open practice. The track was constantly under attack from big wheelers driven by top racers who represented virtually every major manufacturer. Because of the new track layout and the fresh dirt,



In his best "Mr. T" voice, Eustace "Hopalong" Moore was overheard to say, "I pity the fool that gets in the way of my truck."

drivers had to make myriad adjustments to their trucks' springs, shock oil, motors, gears and tires in search of the perfect setup.

...THEN WE ROLL!

• **The Junior Stock Class** competition was fierce and encouraged by plenty of parental cheering from the sidelines. It was great to see so much good-natured spirit expressed as the youngsters battled it out on the track.

WINNERS

Modified A-Mains

2WD	Motor	Truck
1 Jon Anderson	Revolution	JR-XT
2 Ron Rossetti	Revolution	JR-XT
3 Brian Peterson	HPI	A&L
4 Jack Johnson	Revolution	JR-XT
5 Jeremy Kortz	Twister	JG-SRT
6 Nichelle Rivera	Reedy	RC10-T
7 Mike Tuntakit	Revolution	JR-XT
8 Kurt Perham	N/A	RC10
9 Gary Kyes	Revolution	JR-XT
10 Frank Warnke*	N/A	JR-XT

4WD	Motor	Truck
1 Jack Johnson	Revolution	Lazer
2 Jeff Whitman*	N/A	Schumacher
3 Nichelle Rivera	Reedy	Yokomo
4 Richard Trujillo	N/A	Yokomo
5 Tom Clark	Race Prep	AYK
6 David Wilson	N/A	Yokomo
7 Aldo Ruiz	N/A	Yokomo
8 Tom Cox	Twister	Yokomo
9 Jon Anderson	Revolution	Lazer
10 Eustace Moore	Revolution	MIP

A-Main Results

Stock	Motor	Truck
1 Ron Rossetti*	Losi	JR-XT
2 Mike Tuntakit	Losi	JR-XT
3 Scott Brown	Losi	JR-XT
4 Jay Halsey	Losi	JR-XT
5 Kyle Reed	Losi	JR-XT
6 Jason Foster	Losi	RC10-T
7 Tom Pendergast	Losi	JR-XT
8 Richard Trujillo	Losi	JR-XT
9 Scott Hughes	Losi	JR-XT
10 David Potter	Losi	JR-XT



Taking the turns tight was the best way to get around them.

Alex Chavez, from another local track, The Race Place, was the top qualifier. Alex drove his JR-XT 13 laps in 4:18.5—a time that would have qualified him in the Stock Class as well! The main event was spectacular. Alex took off from his front-row starting spot and fought off challenges from JG team racer Jeremy Kortz and others as the crowd of family, friends and racers cheered the kids on. In the end, it was Chavez, followed by Kortz and Mike Bridges.

• **The Stock Class** was perhaps the toughest open class. With the limited power of the handout motors, each racer had to have a great chassis, the right gear ratio and tires, and a clean, error-free run.

"Rocket" Ron Rossetti lived up to his nickname and led all qualifiers pushing his JR-XT an outstanding 13 laps in 4:05.9. It was interesting to note that although a number of "big-name" team drivers were in the A-Main, a few "locals" showed their stuff

(Continued on page 158)

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LETTERS

(Continued from page 155)

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You recently ran an article about the stuff you don't need to be competitive, e.g., all the high-tech equipment. At the end, you wrote that you wanted to receive letters with racing stories in which the underdogs won (instead of receiving all the "I want" and "I need" letters). Two years ago, I raced my Grasshopper (the old kind) against Turbo Ultimas and RC10s. I took 1st place and proved that all the bells and whistles in the world don't win races—practice does.

MARK STAATS
Minneapolis, MN

You're absolutely right, Mark. You don't have to spend a lot of money to be competitive. You just need the right equipment and, most important, good driving skills. How do you acquire good skills? Practice! All the accessories in the world won't make you a better driver, but sharpening your driving abilities will improve your performance.

As Mark has proven, the little guy with the inexpensive car can beat the big fish with their more expensive rides! Keep those underdog letters coming! FM

MONSTER RACE

(Continued from page 157)

as well. Rossetti took the holeshot at the start, but he never had it easy. Mike Tuntakit and Washington's Scott Brown were right on his tail. Kyle Reed made a

(Continued on page 160)

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MONSTER RACE

(Continued from page 158)

charge through the pack, but was defeated by the demanding track. Many thought that the most impressive drive was Jay Halsey's. Jay, who drove a JR-XT, had a horrible start and fought through the pack several times until he actually caught the leading group of Rossetti, Tuntakit, Brown and Reed. Jay's was the fastest truck on the track. As so often happens, he got caught up in another racer's crash toward the end, but he recovered to finish 4th. Rossetti never had a moment to relax as Tuntakit closed to within inches in the last few laps.

• **Modified 2WD** was the fastest field of the weekend. Privateer Frank Warnke from Riverside, CA, upset the top guns by putting in a career drive. He qualified his JR-XT with a track record of 14 laps in 4:16.3. The main event was fast and furious: Jon Anderson pushed his JR-XT into the lead from his outside front-row starting spot, and he was followed by Jack Johnson and me. Anderson pulled away as his pursuers all pushed a little too hard and piled up, slowing down the rest of the pack. The real action was the battle for

(Continued on page 162)

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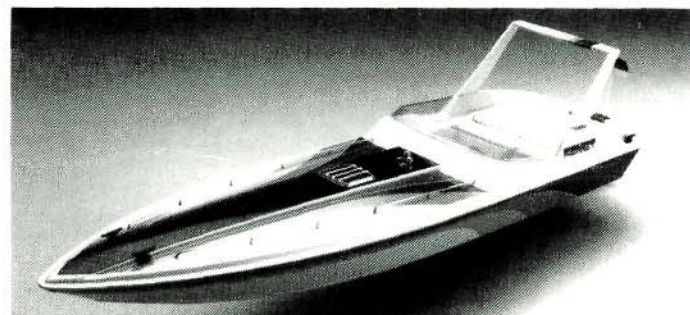
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MONSTER RACE

(Continued from page 160)

second as Johnson's mistakes allowed A&L's Brian Peterson to close in. These two battled door-to-door, nose-to-tail, neither one giving an inch or backing off. Ultimately, this ultra-aggressive driving style bit them both: on the last lap, Ron Rossetti closed to within inches of them. He wisely waited and, as Johnson and Peterson tangled in the last turn, he drove by to take 2nd to Anderson, who was the easy winner. Peterson recovered to take 3rd with Johnson 4th.

• **4WD** was the smallest class, but the drivers put on a good show. A qualifying round placed Jeff Whitman, driving a modified Schumacher, at the top with 13 laps in 4:05.4; Jack Johnson, who finally got the bugs worked out of his Revolution-powered, Grave Digger-bodied Kyosho Lazer, drove to an easy 2nd; and young racer Nichelle Rivera's Yokomo placed 3rd. Johnson and his Lazer took 1st in the Main, with Whitman snagging 2nd and Rivera in again at 3rd.

• **Senior Stock Class** was a real riot; the over-40s were out for fun, not blood. "The Flyin' Fossil" (Gil Losi Sr.) and "JamDad" (Jim Halsey) didn't seem to care who won, as long as they beat each other! As it turned out, "Pops" Losi grabbed the top qualifier's honors with 12 laps at 4:14.5. The rest of the field finished within a few seconds—not bad for a bunch of old...guys? folks? racers? Well, you know what I mean. The main event saw Hugh "Woody" Woods win in 4:18.1. Pops Losi

was 2nd at—get this!—4:18.9, and Bill Birdsall was 3rd at 4:19.7! That's 1.6 seconds between 1st and 3rd. To say that this was a competitive, exciting race would be an understatement.

The absolute highlight of this Main was when Jim Halsey's motor went up in smoke on the next-to-last lap. When Halsey, who was running in the lead pack of four trucks, cleared the monster doubles, he hit the throttle, and his motor suddenly emitted a huge plume of smoke! As he continued around the track, the smoke intensified until the motor finally quit—just after crossing the finish line. Talk about "theatrics"!; some guys will do anything to get noticed!

The Ranch crew worked their behinds off on the rack. Al Hess and Bill Bowerman of the Ranch, and Andy Bartucca of AJ Bracing in Covina, CA, kept the crowd on their feet with their fine announcing and blow-by-blow commentary. If this Monster Truck Championship was any indication, look for more action-packed events in the future. Monster-truck racing is a happening!

TRACK DIRECTORY

In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we print this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, fill out the coupon in this issue and send it to **Track Directory, Radio Control Car Action**, 251 Danbury Road, Wilton, CT 06897. We'll list as many tracks as space allows.

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(Continued on page 164)

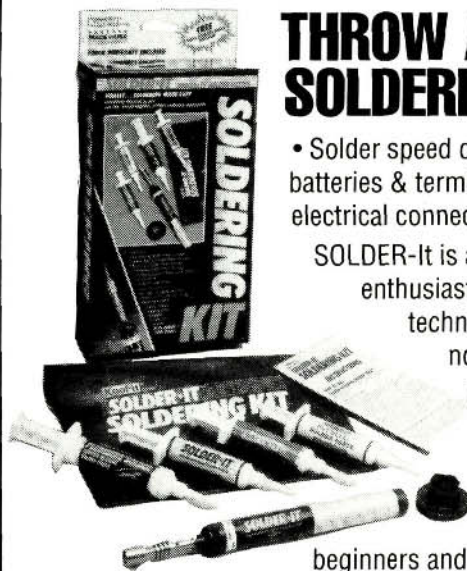
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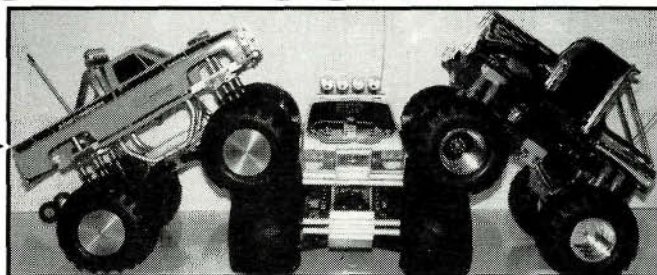
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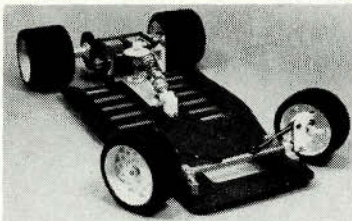


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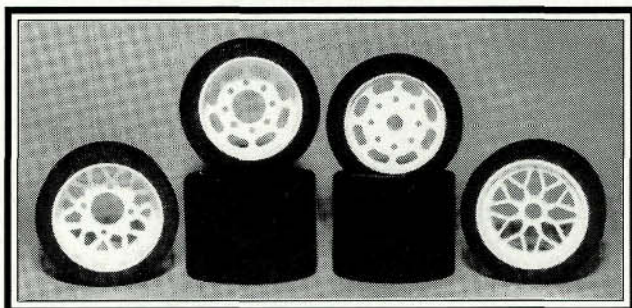
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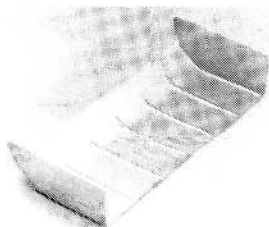
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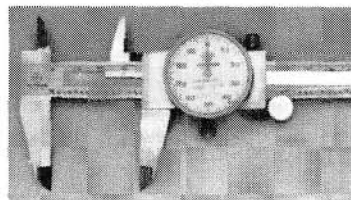
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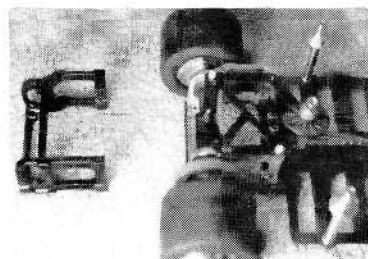
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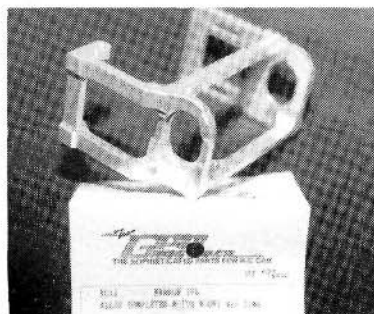
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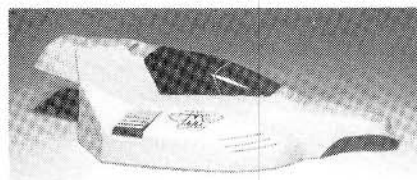
For more information, contact Hobby Etc. Inc., Heritage Place, Rt. 101A, Amherst, NH 03031.



HLR PRODUCTS INTERNATIONAL Bel-Ray Chemicals

Bel-Ray's chemicals are designed specifically for the R/C industry, and they provide the quality and reliability that serious racers expect. Bel-Ray's Motor and Bearing Cleaner and R/C "Trackside" Motor Bath thoroughly clean electric motors, yet they contain none of the solvents that can damage plastic, epoxy, or skin! Bel-Ray has done extensive R&D to produce its multipurpose R/C Bearing and Bushing Lube, which can lubricate ball bearings, Oilite bushings, and motor brushes. Bel-Ray's R/C Ball Diff Lube was formulated to resist the meltdown that can occur when critical temperature is reached inside the diff. It will also stay where you put it!

For more information, contact HLR Products International, 100 Walnut St., Champlain, NY 12919.

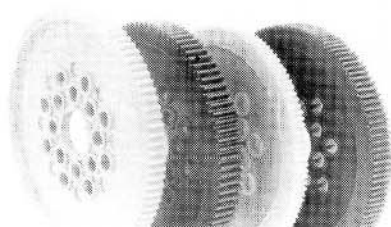


McALLISTER RACING Venom

The future is here for off-road and all-terrain R/C vehicles! The sleek, aerodynamic Venom body has lots of detail and a space-age cockpit.

Part no. B-154

For more information, contact McAllister Racing, 2245 First St., Unit 105, Simi Valley, CA 93065.



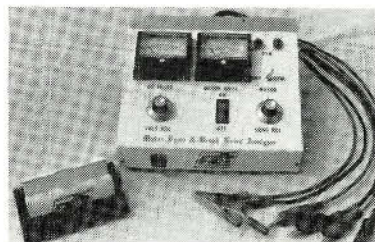
DU-MOR R/C Precision Spur Gears

Du-Mor R/C, one of the leaders in R/C gear manufacturing, is proud to introduce two additions to its line of ultra-precise spur gears. The standard Du-Mor spur gear is available in 64 pitch (98-, 100-, 104-, 108- and 120-tooth sizes) and 48 pitch (78-, 81-, 86- and 90-tooth sizes). These composite-filled nylon gears are made using a highly advanced injection-molding process that makes them incredibly accurate. Du-Mor now offers Pro-Thin gears, which are narrow versions of their standard spur gears. Pro-Thins are available in standard sizes, but they've been "shaved" from .200 inch to .110 inch for less friction and longer run times. Du-Mor's Star Force gears—a line of super-precise, beveled, profile spurs—combine the strength and reliability of standard gear with the low friction and efficiency of a thin gear. Star Force gears are available in 48 pitch (93-, 96- and 85-tooth sizes) and 64 pitch (110-, 115- and 125-tooth sizes).

For more information, contact Du-Mor R/C Inc., 1002 Union Landing Rd., Cinnaminson, NJ 08077.

Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Radio Control Car Action**, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in **Radio Control Car Action**.

WHAT'S NEW

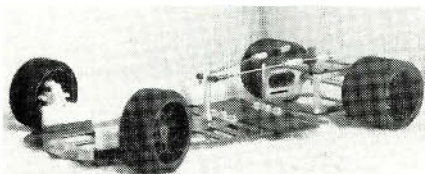


McLIN RACING Motor Machines

These new Motor Machines allow you to actually see "brush hop" and dirty commutators. You'll be able to tell when bearings should be replaced or whether your commutator should be trued. You'll see on a meter what's shown on a screen. Test your modified motors with the three-stage load, then, when it's time to rebuild, you'll know the level to which its performance should be restored. Use the dyno to compare and test motors and obtain some indication of what a motor will do on the track. Run faster and more consistently with the BNA 1000.

Price: \$245

For more information, contact McLin Racing, 4314 W. Hundred Rd., Chester, VA 23831.



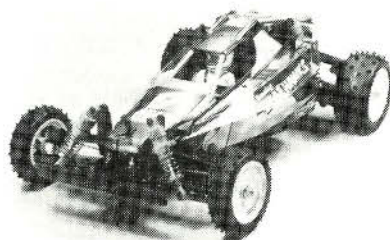
DTN ENTERPRISES Shadow

The Shadow Pavement/Oval Q/C Graphite Car Kit includes graphite chassis parts, aluminum rear mounts, front and rear wheel bushings, hubs, wheels and tires.

Price: \$249.95

Part no. 10-15

For more information, contact DTN Enterprises, P.O. Box 1003, Kaneohe, HI 96744.

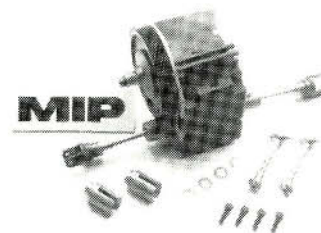


MRC Bear Hawk

MRC/Tamiya's Bear Hawk is an off-road R/C car that's rugged, yet affordable. It has a tough, plastic, bathtub chassis, double-wishbone front and rear suspension with friction dampers, and pin-spike tires for great traction in dirt. The 2WD planetary-gear differential is in a sealed gearbox, so dirt can't damage it. A 540-type motor and a three-speed forward-and-reverse speed controller handle the power. A simple 2-channel surface-frequency radio and a 7.2V battery are all that's needed to control this beast.

Part no. 58093

For more information, contact MRC, 200 Carter Dr., Edison, NJ 08817.



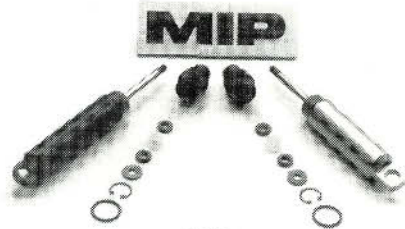
MIP MIP Bones

Even the factory team has the advantage of MIP Bones on their standard Losi gearboxes. MIP Bones improve stability and handling over rough terrain and increase overall acceleration. They take only minutes to install.

Price: \$28/set

Part no. MB-100

For more information, contact MIP, 746 E. Edna Place, Covina, CA 91723.



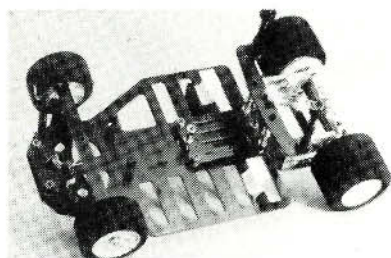
MIP Shock Cartridges for Losi Cars

The answer to your leaky Losi shocks is here! MIP's stock replacement cartridges of blue anodized aluminum with dual blue seals and guides. These cartridges include MIP's new, innovative, lubricated wipers, and they come ready to install (some assembly required). Rebuild kits also are available.

Prices: \$14.95/pair (shock cartridges for Losi cars); \$2.95/pair (cartridge rebuild kit).

Part nos. MC-200; MC-50.

For more information, contact MIP, 746 E. Edna Place, Covina, CA 91723.



BOLINK LTO 12

Bolink's championship-winning LTO is now available in 1/12 scale. At the 1990 ROAR Paved Oval Nationals, Ricky Jordan drove it to 1st place in 1/12-scale Modified. At the Alabama State Ovals and the Mississippi State Ovals, Jimmy Simmons drove it to win, and it set track records in both states. Bolink's LTO 12 isn't for all oval racers—only those who want to win!

Price: \$225

Part no. BL-1359L

For more information, contact Bolink R/C Cars, 420 Hosea Rd., Lawrenceville, GA 30245.

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(Continued from page 184)

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(803) 669-1695

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James Bond (803) 278-0531

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R/CAR RACEWAY PARK

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Nashville, 37217
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(901) 357-7260

R/C RACING OF MIDDLE TENN.

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(817) 267-6745

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South Chisolm Trail Dr., Round Rock
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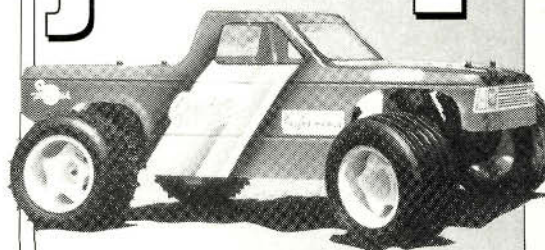
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Smooth operator

WHY DO WE race R/C cars? In my opinion, it's to complicate our lives. We're not content unless we win, and even then, some of us aren't happy! We're constantly on the lookout for new gizmos we think will make victory easier. The manufacturers are aware of this, and they're happy to oblige.

Shinwa*, the Motor Dresser company, has released another product to help us achieve our R/C - stardom goals—the Operate battery charge/discharge timer.

THE "OPERATE-IVE" WORD

The Operate is designed for racers on budgets; Shinwa claims that using it with your favorite charger/discharger will give you the features of the more expensive equipment. Here's how it works: the Operate's built-in timer reads the current level in your discharger/charger to measure the time that elapses during each cycle. The theory behind this is that the longer a battery takes to discharge at a given amp draw, the longer its run times will be. Sometimes, batteries prematurely trip the peak-detector during the charge cycle (a "false peak"). The Operate can help to prevent this by timing the charge cycle.

THE BASICS

When I opened the Operate's box, I was impressed by the unit's looks; it seemed to be based on the KISS principle (keep it simple, stupid). Also included were a nice decal sheet and a piece of paper that I darn near threw away. This turned out to be the instruction sheet! I realize that Shinwa is based in Japan, but the Operate's instructions could

have been written in Greek for all I knew. (In all fairness, Shinwa isn't the only company with this problem.) Fortunately, the unit is so easy to "operate" that I was able to figure it out in a few minutes.

In the charge mode, you

button labeled "Power." The LCD clock display came on, and I knew that the Operate was receiving power. As soon as the charger began charging, the Operate's timer started counting off the seconds. (Don't charge with more than 7 amps through the Operate!)

When my charger stopped,

battery pack big time.

DOIN' A DISCHARGE

To use the Operate for discharging, just replace the charger with your discharger. A "set" discharger yields the best results, e.g., a fixed-rate ballast resistor (available at Radio Shack) or a light-bulb discharger with only two or three bulbs. (Remember, don't exceed the 7A draw limit.)

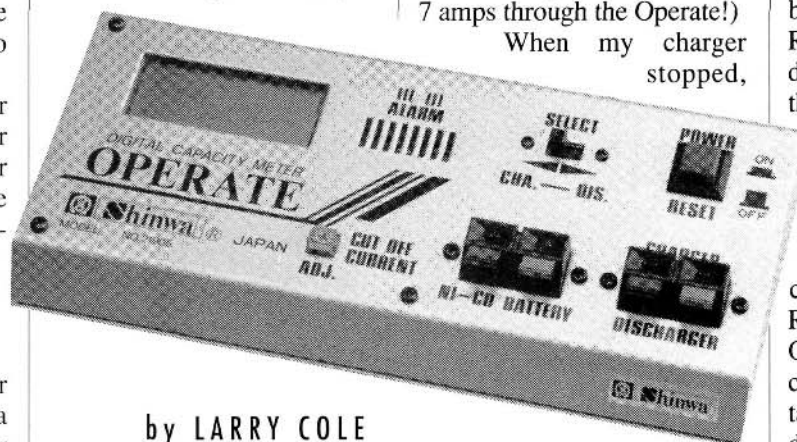
After I had connected the battery and the discharger to the Operate properly, I moved the switch to "Discharge" and hit the "Power/Reset" button to start it. The Operate's display began to count the seconds that it was taking the battery to discharge down to my pre-set reading of 3.5 amps. Remember, the Operate doesn't stop the current flow. Excessive discharging can damage batteries, so make sure you turn the Operate off as soon

as it has finished!

The Shinwa Operate can be beneficial to "budget" racers. Its ability to time charging cycles can be very useful at the track when you don't have time to monitor the charger to make sure it hasn't false-peaked. Although I think its retail price of \$149 is high for its target market (i.e., racers who can't afford the more expensive charger/dischargers), it will give them a competitive edge over other "budget" racers. It really doesn't have a place in a serious racer's arsenal, though, and its instructions need to be improved. All things considered, however, the Operate "operates" very well, thank you.

**Here's the address of the company featured in this article:*

Shinwa; distributed by Pacific Trading Co., P.O. Box 3593, Mission Viejo, CA 92690. ■



by LARRY COLE

Shinwa Operate

simply connect the battery charger to the unit. To do this, I had to make an adapter that ran from my battery to the Operate. It consisted of two, short, color-coded lead wires with a connector that would mate with the one on my battery pack. I stripped about 1/4 inch of the insulation off the wires' ends and then hooked each wire to its corresponding black or red button that's located under the word "Battery." When you release each button, a self-locking mechanism holds the wire in place. I followed the same procedure to hook-up the charger (yup, I made another adapter), but this time, I put the wires in the holes labeled "Charger."

I planned to charge the battery, so I moved the select switch to "Charge" (you can tell that I'm a real rocket scientist!) and then pushed the

the Operate's timer stopped, too. The displayed time gave me a good indication of whether the battery had been charged or not. This system replaces the conventional "check-to-see-if-it's-warm" method.

An alarm will sound when the timer stops. (It will give you instant heart failure if you're not expecting it, so consider yourself warned!) I like this feature. With the Operate hooked up, you don't have to keep checking the charger; just wait for the alarm while you work on other projects.

A few words of caution, the Operate *doesn't* stop the current that's running to your battery. If you use a charger that doesn't have peak detection, make sure that you turn it off as soon as you hear the alarm, or you could fry the

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